DECEMBER 10, 1936

THE IRON AGE

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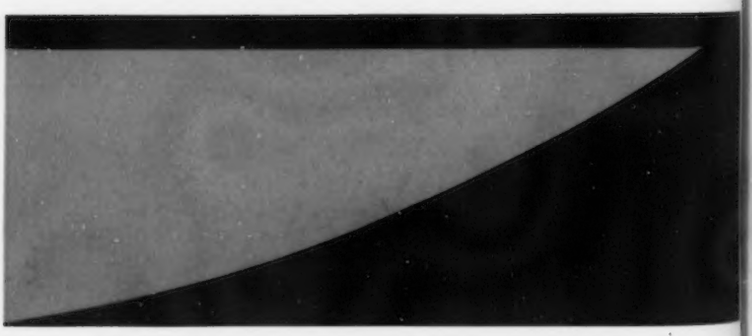

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DECEMBER 10, 1936

ESTABLISHED 1855 Vol. 138, No. 24

Beware of Bottle Necks

BOTTLE necks are probably as old as bottles themselves. We know that they were part of the ancient Egyptian bottles produced many years before the Christian era, which were made by dipping a sand core, mounted on a copper rod, into molten glass. The rod formed the neck of the bottle, and after it was pulled out came the task of digging out the sand.

Bottle necks serve a useful purpose in providing a convenient place for a cork to keep the contents from coming out. That is a desirable feature.

But bottle necks in industry are just the reverse of desirable. A bottle neck in an industrial plant department keeps the contents of that department from flowing out freely. It slows down the capacity to produce.

Good management is constantly on the lookout for bottle necks, realizing that a chain is no stronger than its weakest link. A bottle neck operation with 15 per cent efficiency will pull all of the 85 and 90 per cent operations in a production line down to its own low level.

Bottle necks are subject to cyclical trends. You will find that they multiply fastest on the upturn after a depression. And at that time, which happens to be now, management must be most alert to eradicate them.

Bottle necks are no respecters of places or persons. You will find them all over the plant.

In the production department, look for bottle necks wherever machines and tools have been in use for five years or more; wherever materials handling methods have not been revamped within the past three years; wherever power transmission methods have not been scientifically studied and remodeled within a similar period.

These physical bottle necks which have to do with equipment are remediable easily and quickly when once found. There are other bottle necks that have resulted from the depression which are more mental than physical and which will be much harder to eradicate.

Skilled labor shortage, for example, is an increasingly frequent bottle neck. It must be corrected by the intensification of employee training.

Executives in high or subordinate positions who have gotten "behind the times" and who cannot be made to catch up with them are also serious "mental" bottle necks. These obsolete flesh and blood detriments to a business can cause more slowing down, perhaps, than can obsolete equipment. And you cannot replace them overnight.

In this little essay, it might be well also to speak of those bottle necks that are to be found within each one of us. For very few people do not have some bad qualities that slow down the outpouring of ability which good qualities should make possible. What good, for example, is a 95 per cent genius who possesses only a 5 per cent will to apply his talents?

J. H. VanDeventer

TOOLING for BUICK'S HYPOID CARRIER

o o o

By FRANK J. OLIVER
Detroit Editor, THE IRON AGE

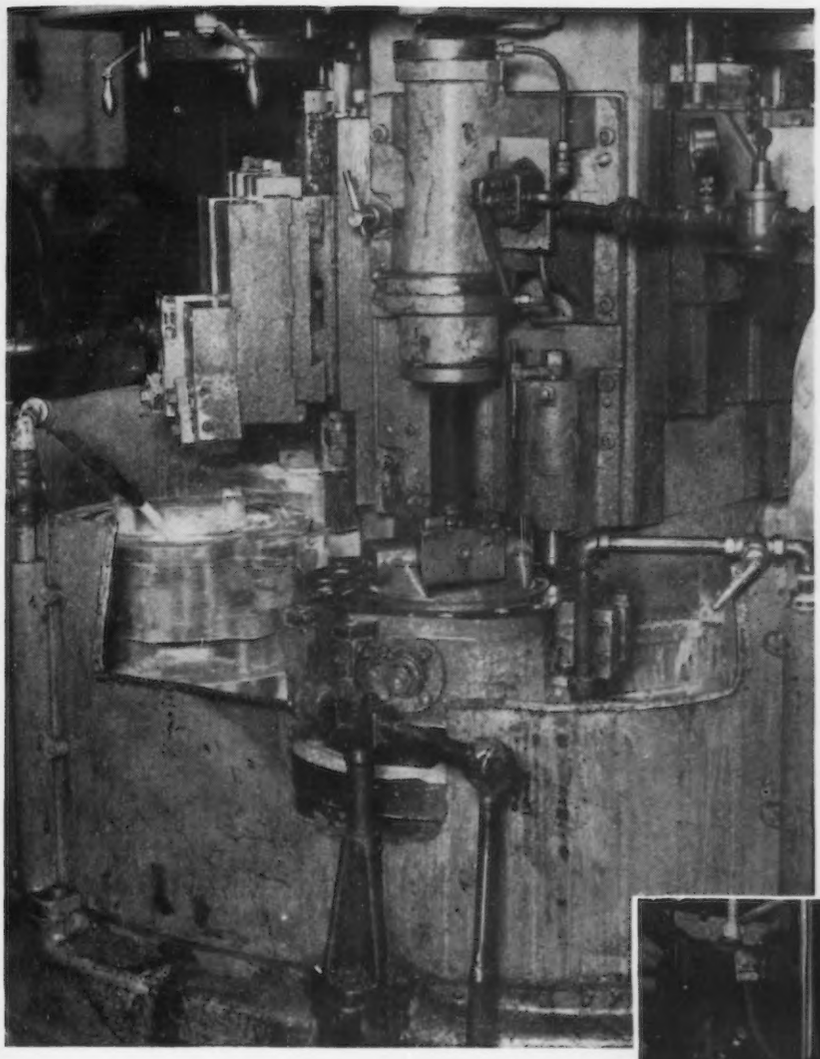
o o o

ON top of a complete plant rehabilitation program in 1935, Buick Motor Co. has again stepped out and spent in the last few months another $14,500,000 for new equipment, new buildings and new layout in preparation for 1937 models. Part of this money this year goes into plant expansion to take care of a larger volume of business. Part of it was spent for new machinery necessitated by engineering changes, such as the adoption of hypoid gears for the rear axle. Although older existing Gleason spiral bevel gear machines and cutters could have been revamped for generating these hypoids, Buick chose to buy a complete battery of new units to take advantage of the faster cutting time available on the new machines.

This same move also obsoleted all tooling for producing the differential carrier since the axis of the hypoid pinion is offset one and three quarter inches below that of the ring gear. In the former spiral bevel drive these axii are co-planar. This offset necessitated such radical changes in tooling requirements, and fixtures as well as machine design, that the obvious solution was to put in an entirely new line of equipment designed from the ground up to do their specific job. This has been done with but one exception and that machine has been completely retooled.

The main piece of this carrier is a malleable casting having a flanged portion which is bolted to the banjo axle housing, half bearings for the differential supports to which bearing caps are bolted, and a pinion support tube. The first operations on the rough casting are to face these bearing cap seats and the flange, drill the flange and bearing cap holes and countersink the latter. These multiple operations are carried on in a single set-up in a 16-in. Bullard Mult-Au-Matic, Fig. 1, a 6-station chucking machine with universal heads, which has been completely retooled.

The first station, illustrated, is for loading the piece with the differential carrier tube end down and in a vertical position. The facing operations are carried on at the next three stations, roughing, semi-finishing and finishing. Stellite J-metal tools are employed at the first two stations, Carboloy tipped tools at the third. In the fifth station



the drilling operations are carried on, and in the sixth, countersinking. Obviously the entire drill head with its guide bushing plate must revolve in unison with the work chuck. Registration of the guide plate with the chuck, and hence with the piece, is effected by an overrunning clutch and lock pin which engages a slot in the chuck face. It is necessary, therefore, to set up the piece in the loading station in the proper angular relation to this drilling operation. This is done by means of a similar locating pin which engages the chuck face at the loading station and an angular locating T-yoke carried on a pneumatic ram. This yoke positions the piece from the rough half holes for the differential carrier. Clamping of the chuck jaws is by hand wrench, carried on a swinging arm. Production on the Bullard is 40 castings an hour.

Two of the bolt holes in the flange are used as locator holes in all subsequent operations. Hence these are reamed with a 2-spindle head carried in a 21-in. Cincinnati drill press. The four bearing cap bolt holes are tapped in a similar Baker drill press with tapping attachment.

Machining Drive Pinion Bores

Drive pinion bearing bores are machined in a battery of four Baker vertical hydraulic boring machines in two different set-ups. Both machines in each battery have 3-spindle heads and 4-position indexing table fixtures, the front position being for loading and unloading. These fixtures are built sturdily and have generous sized plain bearings under the table. A treadle is provided to raise the table on a single ball so that it can be readily indexed by hand and located with a spring plunger pin. In these fixtures the boring bars are piloted both top and bottom, and the bars are driven through a floating Oldham coupling. The top pilot is carried in precision needle bearings, while the lower one is an X-alloy bushing with a conical top to throw the chips. Coolant pumps

ABOVE

FIG. 1—Since drilling as well as facing operations are performed in this Bullard Mult-Au-Matic, it is essential that the casting be chucked in the correct angular position. The air-operated T-fixture does this in conjunction with an index plunger engaging the chuck.

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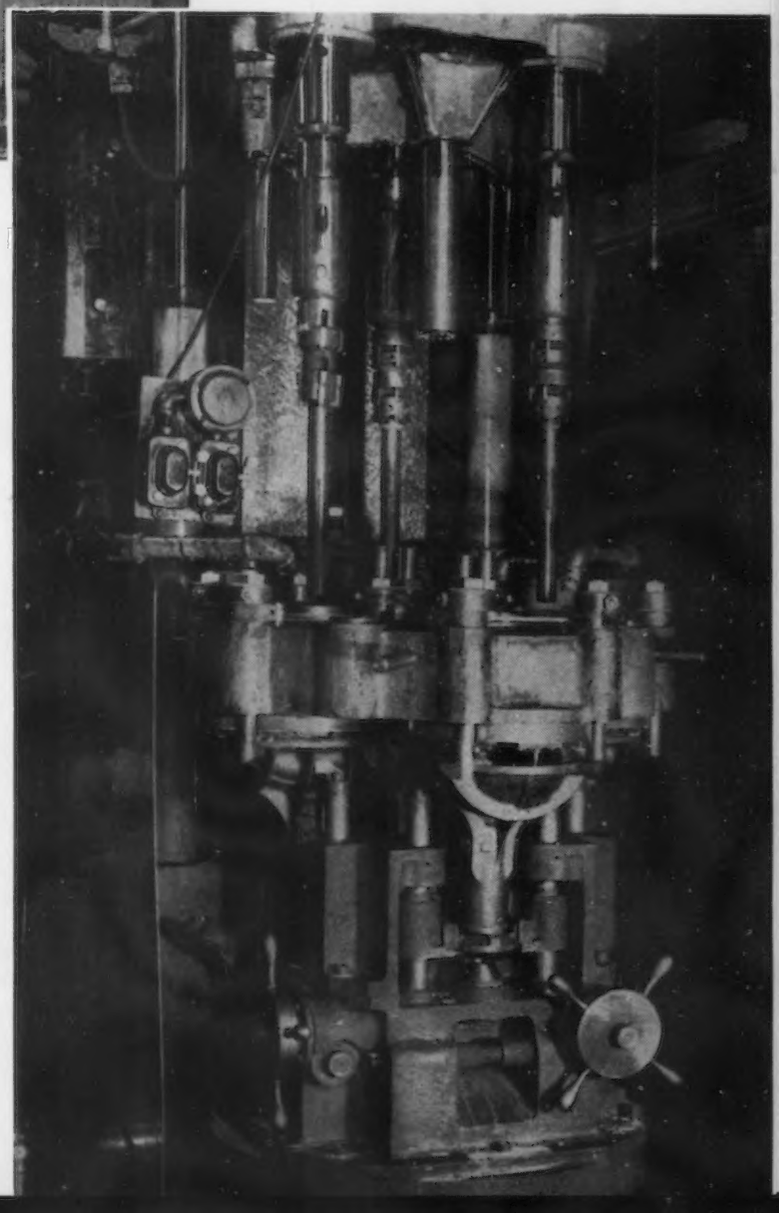
AT RIGHT

FIG. 2—Pinion bearing bores are roughed out in this vertical Baker machine with 4-station table fixture. Bars are piloted both top and bottom. Indexing is by hand while table is momentarily supported on a single ball.



of 80 gal. per min. capacity provide the generous amount of fluid required for tungsten-carbide tools cutting malleable iron.

In the first set-up, the casting is located flange downward, the tube end up. The flange is clamped at the front by two C-clamps and hand wrench nuts, while at the rear the single clamp is actuated by a long rod extending through the top of the fixture. Location and support of the tube end is by three plungers, two of them spring backed and locked in place by so-called whistle notches and hand screws, the third, a hand screw carried on a swinging hinge clamp in front. Obviously, however, positioning of the piece is from the flange surface and the top supports are set accordingly. Dowel pins locate the flange angularly. Ejection of the piece off these dowels is by hand crank and rack and pinion movement on a push bar.

Operations are rough bore the tube hole and clearance hole and countersink the outer end of the tube hole at station two; finish bore at station three, and finish ream at the fourth station. McCroskey reamers are used for the last two operations. In the second set-up Fig. 2, the piece is reversed, end for end, and the large bearing, adjacent to the overhung pinion, is similarly bored and reamed, as well as the sleeve diameter and the small bearing diameter. As before the casting is located and clamped by the flange, which is now up. Two swivel fingers whose movements are tied together by linkage are cammed upward and inward by a single hand lever. A similar flange clamp at the rear is advanced into approximate position through linkage connected with the lower pilot clamp mechanism and is then clamped by hand wrench. The bottom support plate, which engages the tube end, tilts forward for ease in loading and then raises the whole piece to the work position through a pair of rack bars actuated by a capstan wheel and spiral gears.

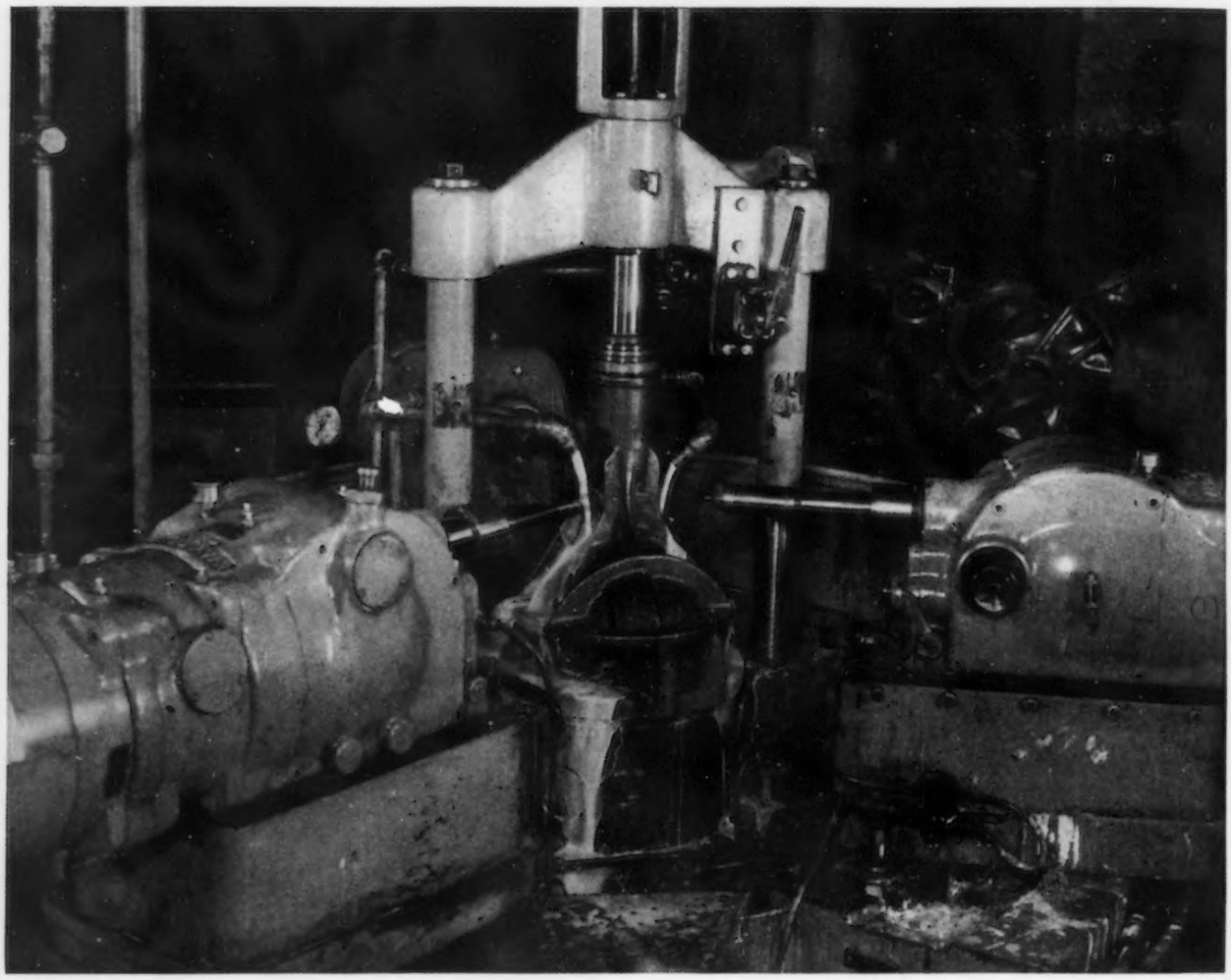


FIG. 3—A ball thrust bearing under the air plunger permits the table to be indexed automatically in this 3-station Kingsbury unit without unclamping the work. Drilling, spot-facing and tapping are performed successively.

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Because of the long pilot bars, extra long saddle movement must be provided—40 in. in this instance. Automatic cycle control provides coarse feed for straight boring, fine feed for counterboring, dwell to clean up the surfaces and automatic return. Output of each pair of machines is 40 an hour.

Successive drilling, spotfacing and tapping of three ½-in. holes spaced equidistant radially in the carrier is accomplished in the set-

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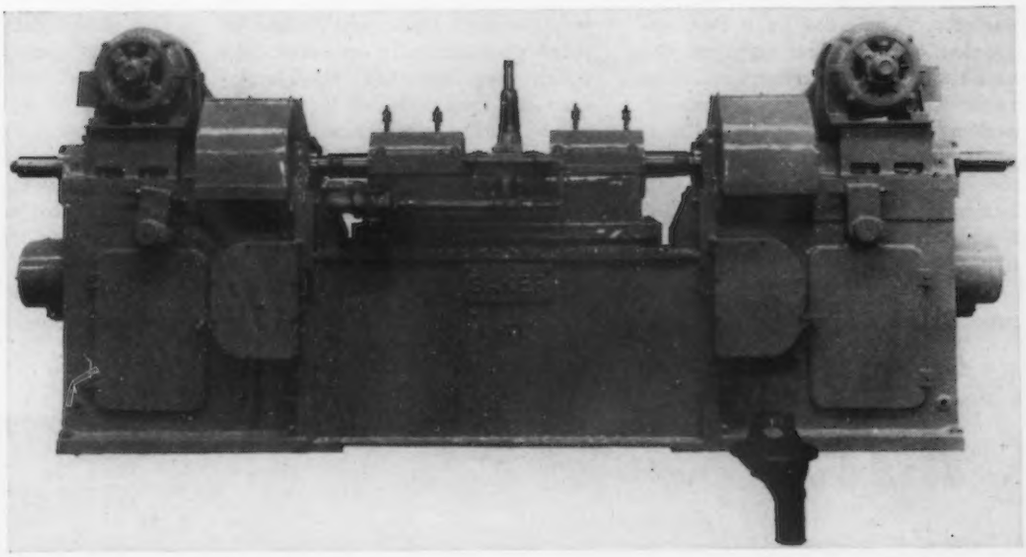
FIG. 4—Coolant is pumped directly into a Y-connection in the fixture of this 2-way borer. Bars are piloted in ball bearing sleeves and floating couplings connect the cam actuated heads.



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up shown in Fig. 3, which is a Kingsbury 3-spindle automatic driller. As can be seen, the carrier is again located by the flange with tube end up and clamped pneumatically. The air plunger carries a ball thrust bearing, permitting the work table to be indexed from station without relieving the clamping pressure. Mechanical cam feed is employed on each independently driven head and automatic table indexing is accomplished through a separately driven Geneva motion. Heads are tripped simultaneously through a pneumatic hookup which also provides an automatic interlock that assures all heads being withdrawn before indexing takes place. Production is 40 castings an hour.

Finishing the Flange and Cap Sects

Final operation on the single casting before the caps are assembled is to finish face the flange and the bearing cap seats. This is done on a simple set-up in a LeBlond engine lathe carrying an offset locating stud on the faceplate. Turning speed is kept low to avoid excessive unbalance on this face plate. Studs and caps are then set with Thor high-frequency nut setters. The assembly now goes through a series of four operations consisting of rough boring the differential bearing holes, finish boring differential holes, large and small pinion bearing holes, tapping the differential bearing holes and burring them.

The first operation is performed in a Baker 2-way boring machine of the cam-feed type, Fig. 4. Assembly is mounted with the small and large bearing holes engaging a vertical stud and the flange resting on three points. Its angular position is fixed by two dowel pins as before. Hand clamping of the

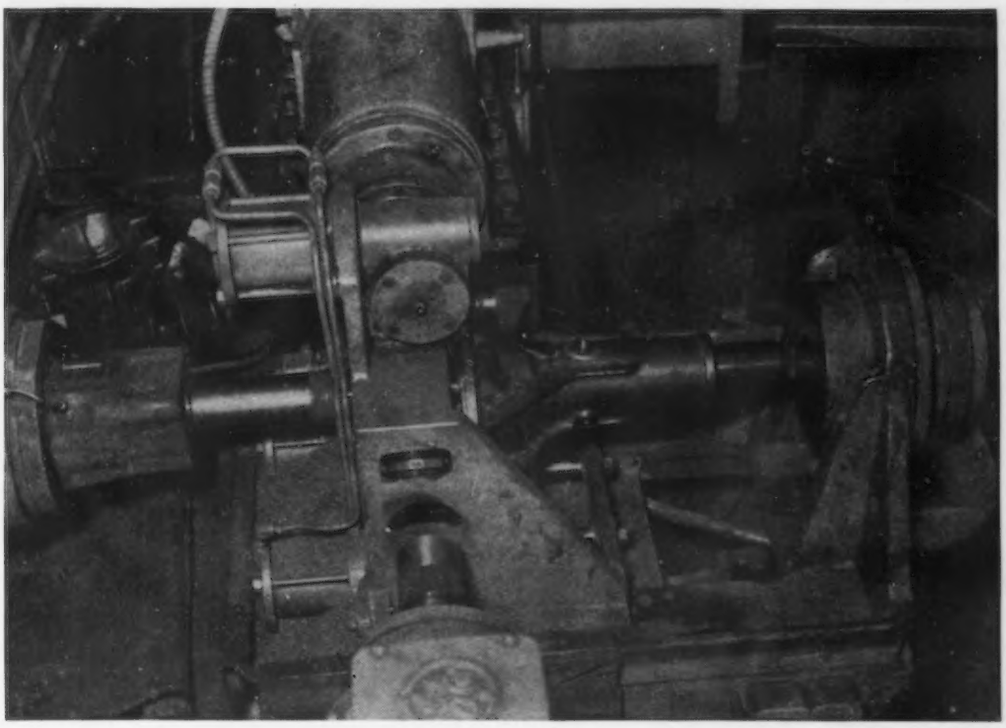

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FIG. 5—Finish boring in three directions at once. Clamping of the carrier flange is effected by three air actuated fingers. Note the outboard pilot at the right.

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assembly is effected by a cone expanded collet which engages the small and large bearing bore. The table fixture is extremely sturdy and carries the two boring bar supports each of which consists of a sleeve mounted on pre-loaded ball bearings. The boring bars are keyed to these sleeves and are driven through floating couplings.

As in many other operations, tungsten-carbide tools are employed and a generous amount of coolant is supplied to each cutter through a Y-connection cored in the fixture. Pump capacity is 80 gal. per min. Each bar carries roughing tools, semi-finishing bits and chamfering tools. Output is 40 units an hour.

These same differential bearing holes and the two pinion bearing holes are finish bored in the second set-up in a Barnes 3-way horizontal boring machine, Fig. 5. The assembly is mounted with the flange in a vertical plane and locked by three pneumatically operated dogs which are revolved one-quarter turn and then pulled in against the flange. Pilot studs again control the angular position. Single-point T-C bits are used on all three bars which are fed hydraulically. The operation is carried on dry. Both differential bearing boring bars are piloted close up to the work in ball bearing sleeves. The bar for the pinion bearing bores, on the other hand, is piloted by an outboard support, also carried in ball bearings.

In tapping the 3-in. internal threads for the differential bearing adjusting nuts, the assembly is mounted in the fixture shown in Fig. 6 under a 24-in. Cincinnati-Bickford box-column drill press. The assembly is mounted on a large horizontal stud engaging the pinion bearing bore and the flange is located angularly by a pilot stud. One side is tapped at a time, using both the upper and lower bearings as pilots for the tap, which is mounted in a Scully-Jones floating tap holder. The holding stud has a half round hole nicked out of it to let the lower tap pilot pass by without interference. No clamping is required, and the piece is indexed the 180 deg. by hand. Production is about 65 pieces an hour.

It only remains to remove burrs from differential bearing bores. This is accomplished in a second LeBlond lathe from which the carriage has been omitted. Instead two guide rails are built up from the bed and on these the differential carrier flange is slid by hand. The reamer bar mounted as an extension of the lathe spindle is piloted fore and aft through the bearings to guide it while burring the threaded portion. It is carried on wet with a soluble oil coolant.

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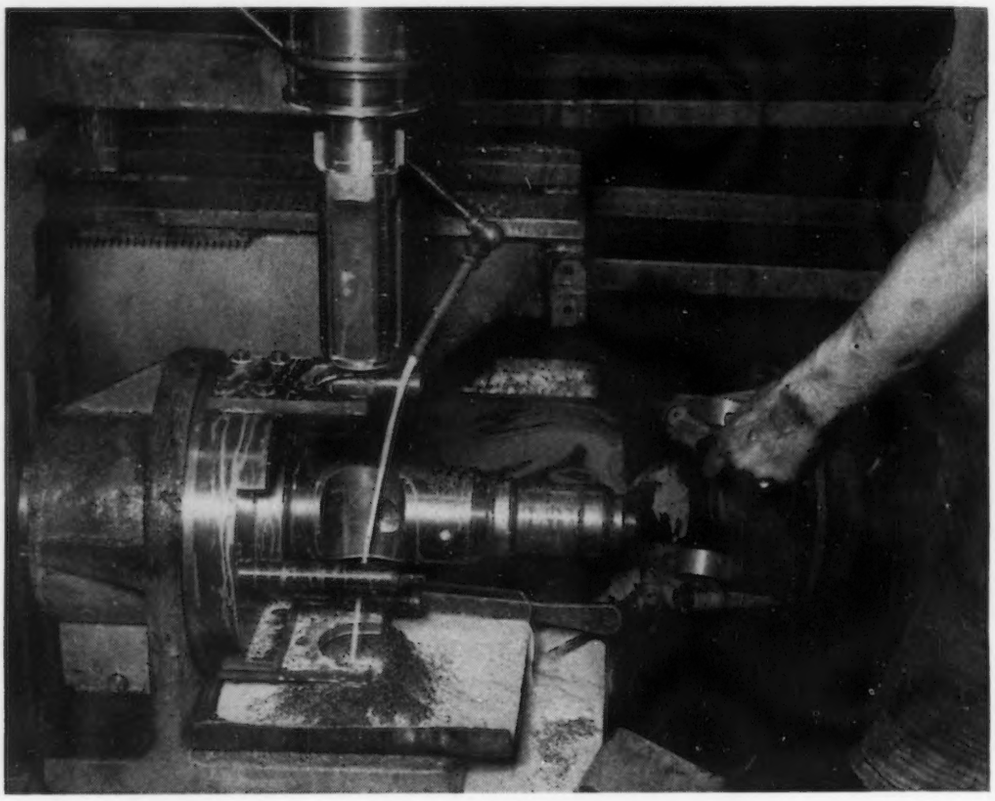
FIG. 6—This heavy stud fixture supports the carrier assembly while the threads for 3-in. adjusting nuts are tapped. The floating tap is piloted through both differential carrier bores.



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MATERIALS HANDLING AS A FACTOR IN ECONOMIC PRODUCTION

By FRANCIS JURASCHEK

Consulting Editor, The Iron Age

NUMEROUS investigations made within recent years in the name of industrial economy have shown that material in the course of production in the average industrial plant is actually worked upon only 35 per cent to 40 per cent of the time. The balance of the working time of the plant is taken up by lifting and shifting the materials to be worked upon from machine to machine, from process to process, or in delivering it into the plant or in taking the finished product into and out of storage and shipping rooms. Many plants are still so poorly organized that the percentage of real productive labor is no more than 15 per cent-20 per cent. Back in 1929 when the wheels of industry were speeding ever faster and faster and production was being organized everywhere on such bases as would enable the utmost in manufactured goods to be produced in as short a period as possible, an estimate prepared by the "Committee on Recent Economic Changes" showed that 22 per cent of industry's labor payroll was devoted solely to handling materials in the average plant. At the time this amounted to more than three billions of dollars.

Today, in spite of the urgent necessities of the past few years of cutting all costs of production to the very bone, these figures have not changed materially. The labor payroll devoted to materials handling work alone is still in the neighborhood of three billion dollars — a tremendous and exacting tribute levied on production economy. "Manpower, once the most easily harnessed force in the universe, and the cheapest, has become the most expensive factor with which industry must reckon." To do any job of lifting, shifting, toting, carrying or conveying by means of human muscle when it can be done more economically by means of mechanism, is *waste*, sheer and simple, no matter how cheap the rate of wage for muscle may be. This was demonstrated most forcibly a few years ago when a contractor building a three-mile long embankment at Shanghai, China, found it more profitable to use a dozen electric industrial

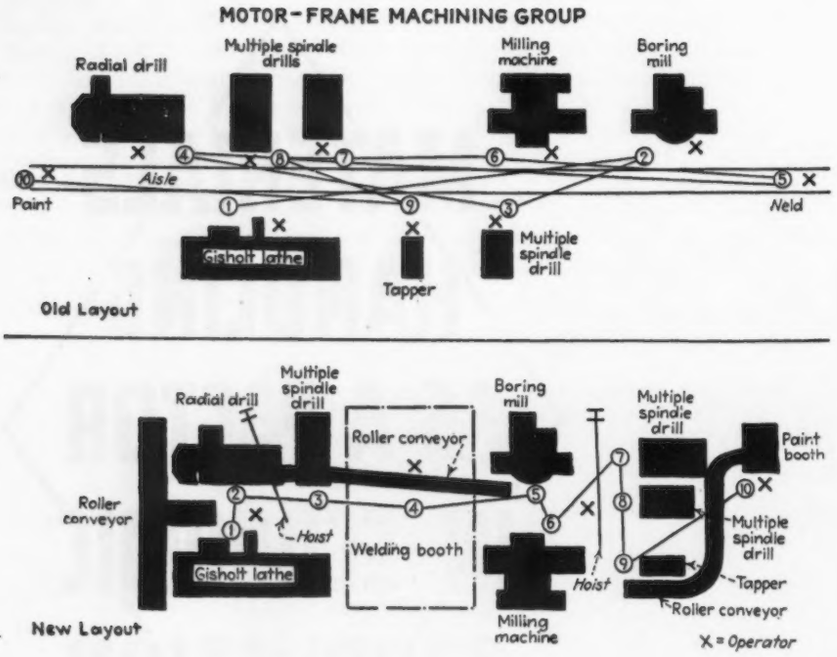

FIG. 1—A relocation of machines according to production flow principles made it possible in this department to take advantage of modern materials handling methods to cut down the travel of materials by two-thirds, and to save many labor costs.

trucks with dump bodies instead of three-cents-per-day Chinese coolie labor to transport the fill.

Not every materials handling job can be done more economically mechanically than by hand. Many occasional jobs do not warrant the investment required for mechanical handling devices. But this statement almost automatically sets up the criterion for consideration of what jobs may be profitably handled mechanically: All movements of material which are regular, repeated and/or continuous in their nature. A shining example is the automobile production line, in which the continuous flow principle of production has enlisted the aid of mechanical handling equipment to an astonishing degree.

Improper handling methods, outmoded handling methods, and frequently no *system* of handling at all, are responsible for a surprising amount of wasted human effort in industrial production today. Generally these wastes may be traced directly to a failure on the part of management to analyze intelligently the two inter-related factors of production flow and motion economy. Conversely, where these two factors have been carefully considered in a plant, not only will direct savings be found in the handling of materials, but other, indirect, savings almost inevitably result, in the speeding up of production, the lowering of the cost of applying power to machines, the reducing of working inventories, and often in the improvement of the quantity and quality of the product.

Watch the Small Loads

It is not surprising that the handling of loads of great tonnage has had far more attention from management than the handling of small loads. Large loads are more obvi-

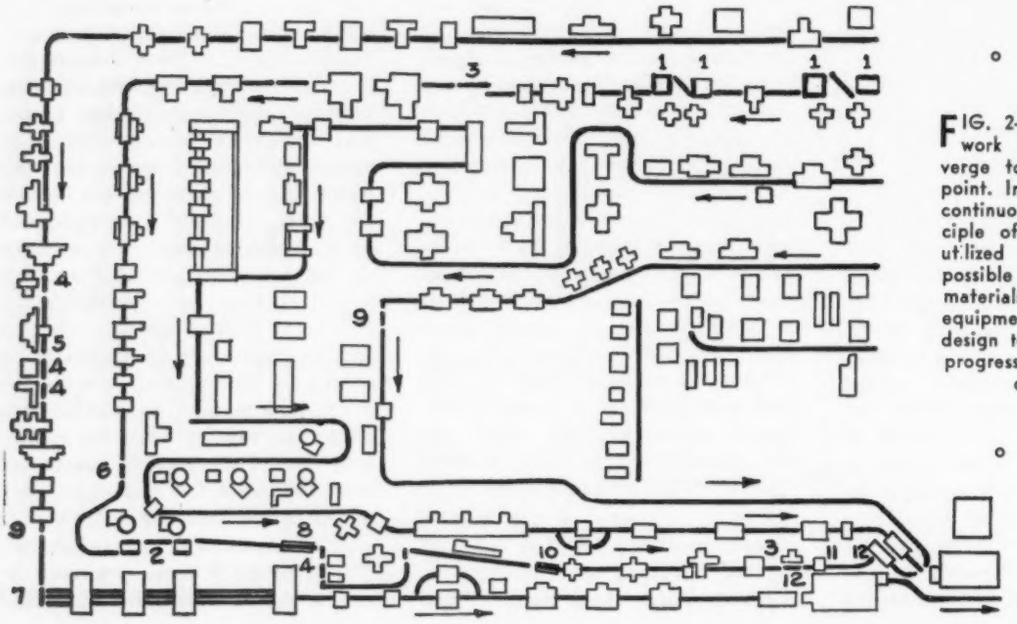

FIG. 2—Five lines of work gradually converge to one delivery point. In this layout the continuous flow principle of production is utilized to the fullest possible degree, with materials handling equipment of special design to facilitate the progressive movement of work.

ously potential sources of wasted human effort. But frequently the sum-total of the efforts required to handle many light loads often and repeatedly in the plant by muscle instead of intelligence will outweigh by thousands of dollars the costs of moving the occasional or even consistent large loads. It is in the careful planning and systematic routing of all materials handling materials. This is perhaps an over-simplified statement, but a little thought will show that

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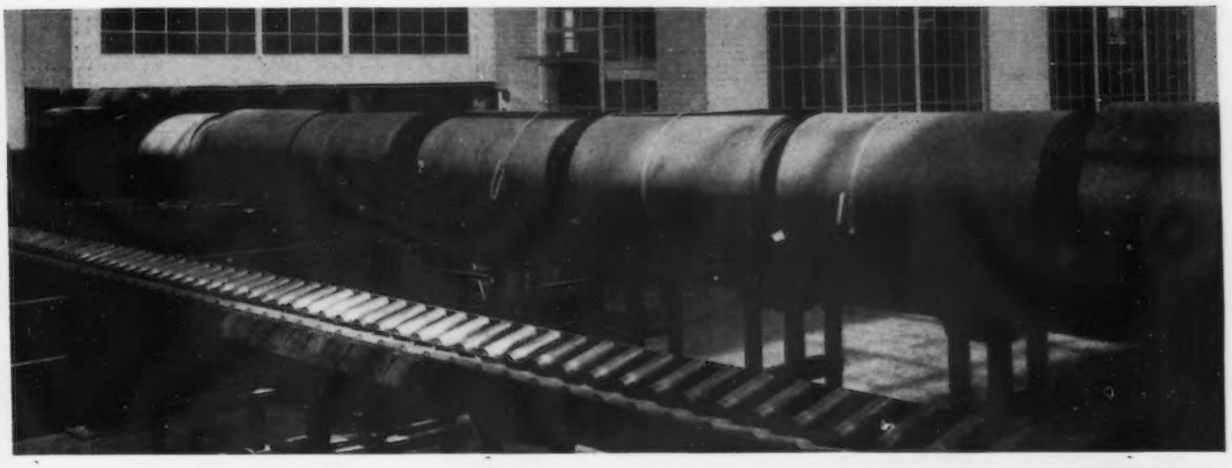
FIG. 3—One of the newest developments in the handling of coils of strip metal is the trough-section roller conveyor. The coils roll by gravity from one part of the mill to another. Designed and installed by Mathews Conveyer Co.



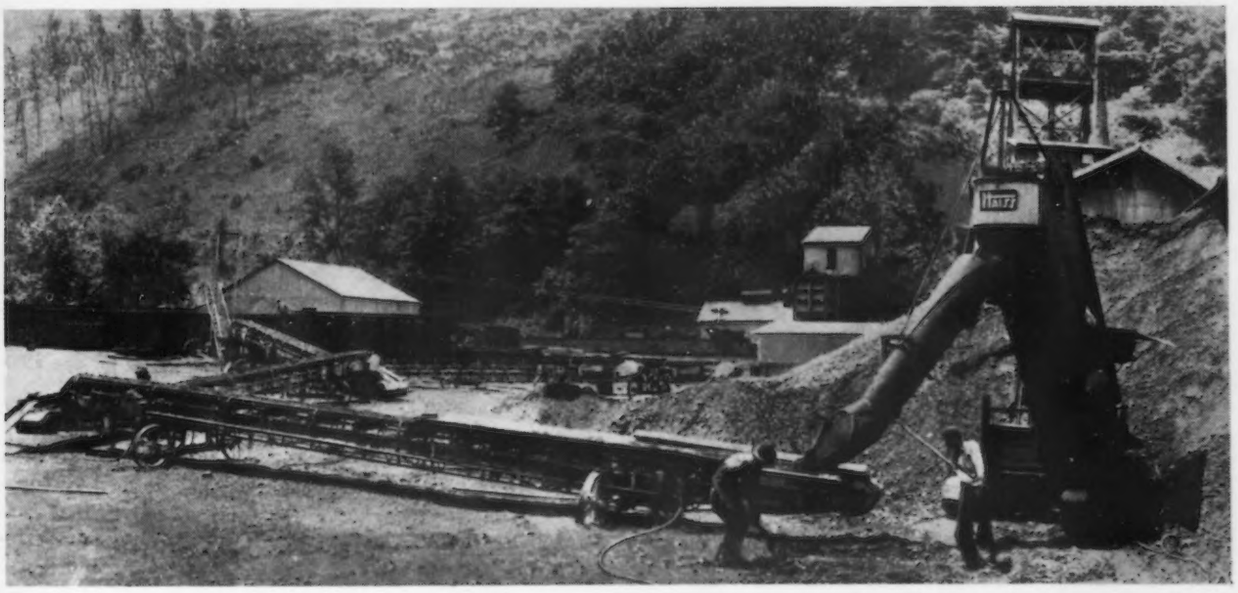


FIG. 4—Reloading coal (or any similar loose material) is made an economical proposition by means of such equipment as is here illustrated. A Haiss loader picks up from a storage pile, and delivers the material to portable belt conveyors to bins or railroad cars.

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that much can still be done to reduce the three billion dollar tribute levied on production by hand labor.

Systems of Material Handling

Briefly stated, all materials handling equipment does one or both of two things: It lifts a load, it shifts a load, or it both lifts and shifts a load. In the various combinations of these efforts are contained all the problems that are involved in making up a system of such over-simplification is worth while, if for no other reason than to center the attention on the fundamentals of the situation. The types of equipment fitting into these categories may be listed roughly as follows:

LIFTING EQUIPMENT

Cranes: Hand, Power, Overhead, Jib, Gantry Wharf, Magnet.
Hoists: Hand, Power, Pneumatic.
Derricks: Stationary, Traveling, Portable, Cargo.
Winches.
Elevators.
Loaders: Log, Car, Grab-buckets, Skips, Power Shovels, Dredges.

SHIFTING EQUIPMENT

Cableways: Suspension, Cable-tramways.
Overhead Trackage: Tramways, Trolleys.
Conveyers: Package, Loose Material, Assembly, Gravity.
Industrial Railways.
Industrial Trucks and Tractors. Hand Trucks.
Commercial Trucks and Tractors.
Ships: Scows, Barges, Ore-handling Vessels, Tankers.
Railroad Cars: Dump-cars, Special

Gondolas LCL Compartment Cars.

LIFTING AND SHIFTING EQUIPMENT

Overhead Cranes and Trackage.
Special Industrial Trucks, Tiering Trucks.
Elevating Conveyers.
Loose Material Blower and Suction Systems.
Coal and Ash-handling Systems.
Lime and Stone-handling Systems.
Derricks: Stationary, Traveling, Portable, Cargo.
Various combinations of lifting and shifting equipment, etc., etc.

In the application of all these types of equipment to industrial production the economic problems involved include not only consideration of the most efficient and lowest cost means of getting materials to and away from jobs, but are concerned likewise with the factor of the utmost motion economy at the machines of production. Hence the study of any particular materials handling problem is inevitably linked up with a study of the economics of production flow.

For instance: In a mid-Western plant manufacturing automotive equipment, continuous but haphazard growth over a number of years had witnessed the addition of several one and two-story buildings and sheds to the original three-story plant, and the placing of machines in these buildings in locations better adapted to the exigencies of building construction than to the orderly flow of economic production. Then a change in management made possible the moving of the business to a plant in another city, where a brand new building was erected to house the production of the equipment formerly made in the old plant. A real opportunity was presented to lay out the operations logically in the new building and to take advantage of modern mechanical handling systems to tie together the various steps of the production processes. The net result of the changes effected were these: In the manufacture of a carburetor in the old plant the total length of travel of all the parts going into the finished product was 3750 feet, at a handling cost estimated at 87 cents per carburetor. In the new plant the length of travel was cut down to 960 feet and the handling cost to less than 36 cents per carburetor. This is not an unusual example of the savings which may be effected by orderly and mechanical routing of materials as compared with haphazard production methods.

Considerations in Design

The first consideration in the design of a materials handling system is that of the material to be handled. Loose material may be sucked through pipes, or transferred by grab-buckets to storage bins, or deposited on conveyer belts.

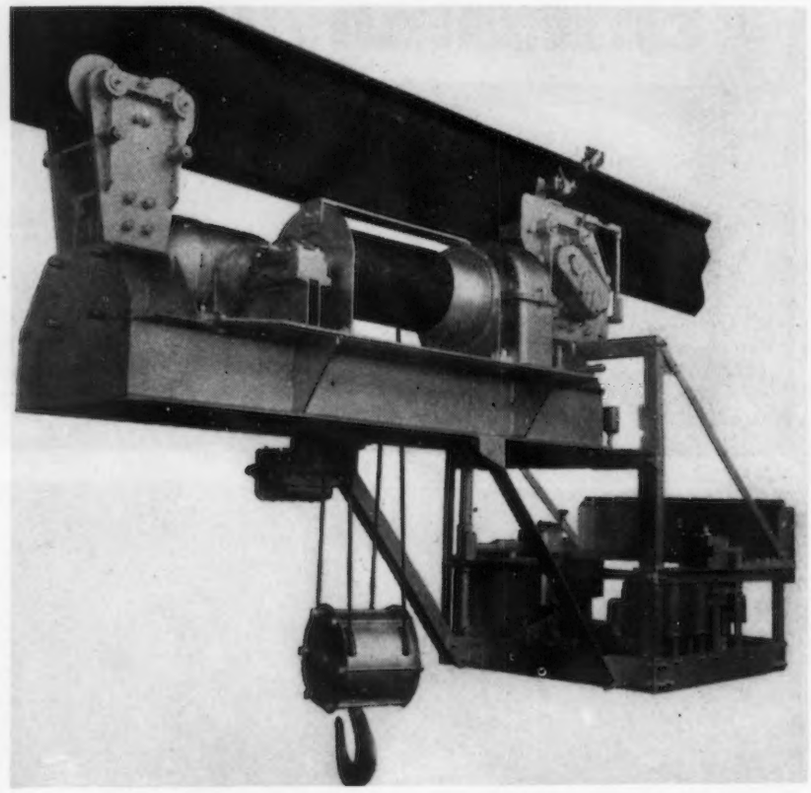

FIG. 5—A recent 10-ton mono-rail electric hoist with attached cab developed by Euclid Crane & Hoist Co. conserves weight and thus requires less power for operation because of the extensive use of welded construction.

Small articles may be placed in tote boxes and carried by roller conveyers or picked up in slings by hoists on overhead tracks. Larger pieces may be picked up by magnet cranes, if of ferrous material, or in slings by cranes or hoists, or (in the case of boxed materials or material in rolls or sheets) picked up on hand trucks or special types of industrial trucks, for transfer. The type of material to be handled will thus exercise an influence on the choice of equipment to handle it effectively.

The second consideration is the layout and character of machines to which the material is to be delivered, or the character of the process by which the material is to be treated. Ladles of molten material may be effectively handled by crane or a combination of hoist and overhead trackage; materials in tote boxes or in bales, bundles, rolls or sheets may be handled effectively by belt or gravity roller conveyors; heavy parts may be spotted accurately on machines by cranes or traveling hoists; coils of wire or strip metal, or rolls of paper may be effectively handled by conveyors or industrial trucks or tramway systems; bars, rods, tubes and sheets may be handled by conveyors, or in special slings on tramway systems, etc., etc., in accordance with the needs of the machines or processes to which the material is being brought, or from which it is being taken away. The possible arrangements and combinations of equipment and methods are almost infinite, and the choice leaves the user with ample scope for the use of his imagination in the matter of securing effective handling at low cost.

The third consideration in designing a materials handling system is that of the flow of production through the plant. This in turn is linked up with the question

of motion economy leading to, actually at, and going from the machine or process under consideration, and also the allied question of the effective application of power to that machine or process. Almost inevitably a careful analysis of these interrelated problems results in the salvaging of avoidable wastes in any plant. A study of production flow, in diagrammatic form shows how machines and processes may be so located as to cut down the time and distance of travel from one to another of the material to be worked upon. A study of motion economy at the machines shows whether or not different groupings or placements of the machines will cut down the charges of labor attendance. And a study of power transmission shows what advantages, if any, may be had from the grouping of machines into the most logical production units. Taking these three questions together enables the investigator to plan most intelligently the system of materials handling which will permit the most efficient and most economical movement of the goods worked upon from the raw state to the finished product.

It is a mistake to consider *any* application of materials handling equipment as an isolated problem. To reap the greatest advantages from the substitution of mechanical devices for human muscle, all the factors outlined above must be studied together—for the handling of materials is only one factor of a complete production problem. No better example of the truth of this statement can be cited than (once more) the automobile assembly line. To keep that assembly line moving always forward at a definite rate of speed, so that a finished automobile may roll off at the delivery end according to schedule, every operation in the plant must be keyed into that forward movement. At a given instant this part and that must be delivered to the required point of the line—or else the whole line halts. So in any simpler problem of production, unless all the operations are keyed together, by time of machine work, and by delivery of materials and parts, a hitch occurs in the flow of production—and production costs rise. Of what value is it to speed the delivery of work to a certain set of machines if the means of taking that work away to the next operation in sequence is so slow as to cause a piling up of parts at that point?

FIG. 6—A special design of Mercury electric industrial truck developed for the handling of coils of metal or rolls of material. A smooth, cylindrical ram inserted in the hollow center of the roll picks up the roll from the floor for transfer to another location.

Time Costs Money

Time costs money in the industrial plant as well as effort. Time therefore should be keyed into production just as accurately as effort. Machines only earn their keep when they are working; not when they are idle. Therefore it is essential that the work be fed to the machines just as rapidly as the machines can absorb it, to keep them busy earning profits. Time and effort may be conserved in this connection by planning material handling systems which are keyed into production flow and motion economy.

An interesting example of this principle is given in the charts in Fig. 1, prepared by Allan H. Mogensen. Both charts represent the flow of production in the machining of electric motor frames. As handled prior to an investigation of the economics of the problem the ten operations required criss-crossed backward and forward no less than six times. After the work had been laid out on the straight line, continuous flow principle, it moved progressively from

(CONTINUED ON PAGE 90)

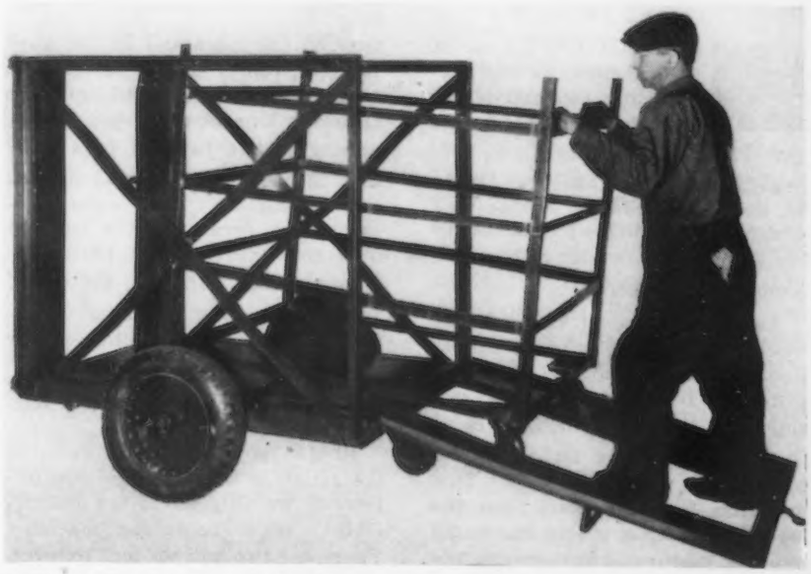

FIG. 7—Service Caster & Truck Co. is responsible for this combination "indoor-outdoor" hand truck arrangement. The lighter "indoor" truck is loaded with material, then rolled onto the "outdoor" truck, the skid side of the latter raised to form the fourth side of the out-door truck, and the whole load moved with ease over distances.

ADVANCED MACHINE TOOL APPLICATIONS AT PACKARD

Part Two

IN this second article of the series of two, machining operations are described on two completely new lines of equipment for connecting rods and pistons for the new Six. The first article, in THE IRON AGE of Nov. 12, page 28, covered unusual operations in the manufacture of the cylinder block and crankshaft.

PRACTICALLY all the equipment in the connecting rod and piston machine lines for the new Packard Six is new and represents the latest practice. Some of the machines are unique and illustrate unusual approaches to the problem of finishing these automobile components.

As in the case of the cylinder block some of the unusual operations concern broaching. After the piston pin boss is chamfered on one side in a drill press, both sides of the bolt bosses and nut seats are broached in an Oilgear unit. This operation is conventional, but the second broaching set-up has some unusual features. In between the two operations the caps are first sawed from the rod forging in a Cincinnati Hydromatic milling machine. There is a double-ended fixture on the table and in the work position, four rods are sawed at a time through the use of only two cutters. This result is possible by arranging two pairs of rods at 90 deg. to each other and 45 deg. to the horizontal. Each cutter engages two forgings at a time at different sectors of its periphery. Enough stock is left on the sawed faces for a later finishing operation. Pneumatic clamping of the work is employed. The other fixture is being loaded during this work cycle.

Broaching of the half holes in the rough in both cap and rod follows in an Oilgear 15-ton double-slide vertical broaching machine. There are two independent fixtures, so that one can be loaded while the other is in the work position. Rod and cap are locked in the fixture by hand crank and cam with an equalizer for high spots, and location is from the bolt bosses to back up the cut on the face and eliminate a grinding operation on the face. A shuttle slide carries each fixture forward to the work position and withdraws it so the tools clear the work on the up stroke. Shuttles are operated hydraulically through separate control levers and are interlocked so that the broach cannot move down until the shuttle slide is in the work position or move up until the shuttle slide is withdrawn. In the work position the shuttles are locked by a double toggle arrangement. Eliminating a rough boring operation, 3/16 in. of metal is broached from the bearing section, leaving 0.0075 in. of metal to be removed later by internal grinding in the cap and rod assembly. A variable-delivery pump permits optimum broach

speed to be selected as experience dictates as regards cutter life between grinds. This particular unit also features hardened and ground ways on both the broach and shuttle slides.

Rods and caps are then placed in pairs in a special Greenlee drilling unit with 8-station trunnion fixture rotating in a vertical plane. Here the bolt holes are drilled in two steps and reamed, and two bleeder oil holes are drilled in the rod. Drill units for the latter are mounted at an angle on the turret housing. In addition there is a milling attachment for cutting the lock grooves in rod and cap. Clamping of the work and indexing of the turret fixture are by hand. Bolt holes are countersunk by hand in conjunction with a pedestal-type, motor driven tool.

Final operation before the caps and rods are assembled is to drill the long oil holes through the web in a 6-spindle Leland-Gifford drill press using fluted high-speed steel drills and step feed to clear the holes of chips. After assembly the faces of the rods are ground parallel in a Blanchard machine so as to act as locating surfaces for the following set-up. In this the piston pin hole is drilled and reamed successively in a horizontal Davis & Thompson Roto-Matic. This machine has an 8-station trunnion fixture rotating in a vertical plane between two 8-spindle heads which rotate with the fixture. Stationary end cams actuate the spindle feed and advance the reamers in the left-hand head after the drills in the right-hand head have been withdrawn. Rods are located on studs at the large end and are clamped by hand. These holes are then chamfered by hand against a reamer drive motor, but the big ends must be chamfered in a drill press.

The rods are now ready to be weighed and equalized by hollow milling at the large end in a horizontal drill press. The bushing at the small end is pressed in by hydraulic press and is chamfered by hand. Weighing and chamfering of the small end then take place. Before the large bore is finish ground in a battery of Heald Gagematics, it is finish reamed and burnished in a 4-spindle drill press.

Final machine operation on the rod is to diamond bore the piston pin hole in an Ex-Cell-O six-spindle double-end precision borer. Three rods are in the work position, while three are being loaded. Rods are loaded in a vertical position with the large bore located on a flatted alining plug and clamped against the ground seats by three swiveling fingers. This arrangement insures the hole being bored parallel with the large end bore. The small end is located angularly with a flattened plug which is withdrawn after two spring plugs clamp the sides. This plug withdrawal is interlocked with the machine cycle. Movement of the table is accomplished hydraulically. Spindles run at 3600 r.p.m., removing 0.008 to 0.010 in. of stock with a feed of 0.0015 in. per rev. The hole is ⅞ in. in diam. by 1½ in. long.

Output for the entire line is set at 300 complete rods an hour at 80 per cent efficiency.

The piston line is set up for 250 units an hour. It has some unusual features also. First opera-

FOUR connecting rods are sawed apart at a time in this unique fixture mounted on the table of a Cincinnati Hydromatic miller. Each cutter engages two rods at a time.

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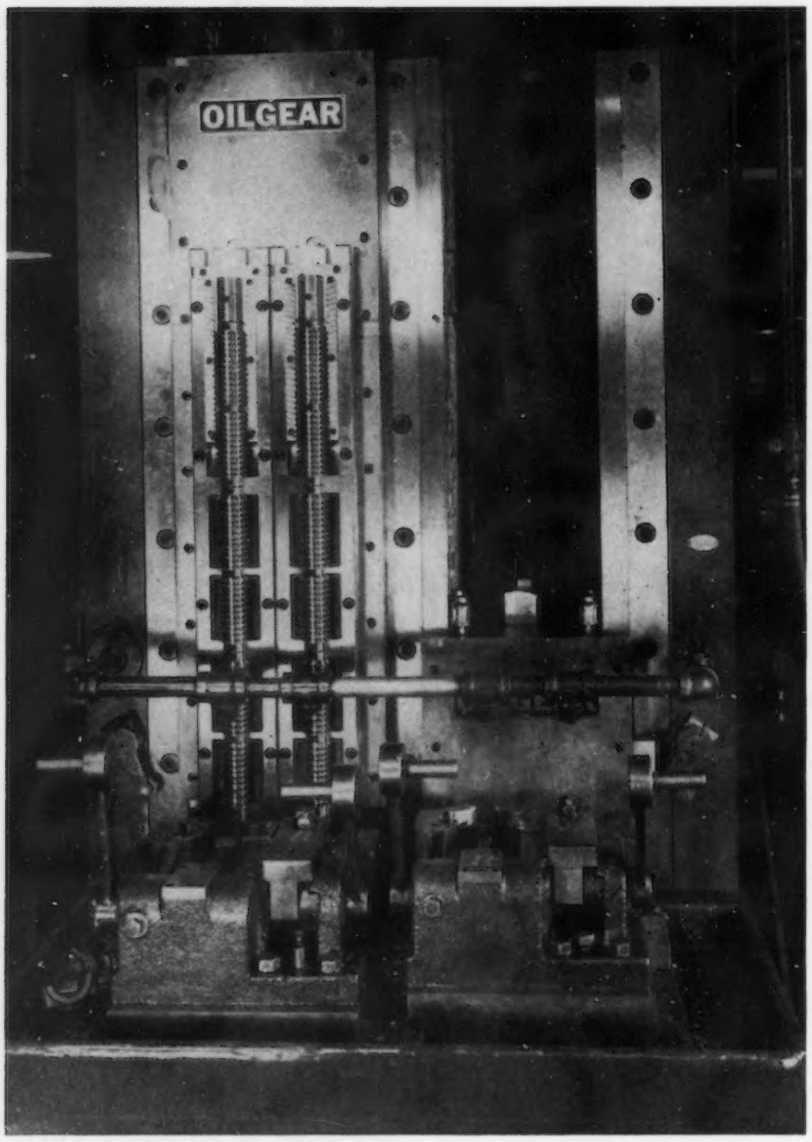
tion is to chuck the rough permanent mold casting in a 4-spindle New Britain-Gridley automatic and perform multiple turning operations. These include rough turning the O. D. and ring lands, rough forming three ring grooves and chamfering them, rough facing and centering at the closed end, and facing and chamfering the open end. All tools are carbide tipped. Compared with the way this job is being handled on pistons for the 120 model, one operation and one handling has been eliminated and production has been increased from 80 to 250 pistons an hour. Although there are four spindles on the machine, only three are working, the fourth being a loading position. Obviously the pistons are chucked from the inside and in this machine double hydraulic clamping is employed through dual cylinders with concentric piston rods. The object is to apply heavy clamping pressure on the closed end of the piston and light pressure on the open end so as not to distort the skirt.



BROACHING of the half holes in the rough in both rod and cap and facing of the joint is accomplished in this double-slide Oilgear broaching machine. The work-holding fixtures are mounted on shuttle slides which are interlocked with the movement of the broach.

The next step is to drill twelve 5/32-in. holes in the third ring groove. This is done by mounting the piston in an indexing fixture in front of a Kingsbury drilling head. At each withdrawal of the drill, the fixture plate is automatically indexed. The head itself carries a drill bushing with extended lug which engages the ring groove. Two such machine units are employed. They compare with one 12-spindle drill unit arranged radially on the 120 model piston.

Multiplicity of Operations on One Machine

Then follows a multiplicity of operations, carried on dry in a special Greenlee machine, facetiously dubbed the "Goldberg" machine because of the many operations it performs. It core drills the wristpin holes, cuts two internal lock wire grooves with expanding tools, drills four ⅛-in. holes in the wristpin bosses at an angle and one ¼-in. hole in the skirt; saws two 3/64-in. slots beneath the third ring land and a similar slot in the skirt. This machine might be described as a 7-way horizontal, vertical and angular drilling and sawing machine. The two angle drill units are quill mounted with totally-inclosed flange-type motors on the ends. There is a three-station hand indexing drum-type fixture mounted in the central position. Each station carries two pistons with the piston pin holes at right angles to each other. One piston is completed at each index of the drum.

The wristpin holes are reamed by hand against a motor-driven tool, and then follows a series of turning operations in lathes. In the first, the piston is chucked in a Sundstrand automatic lathe, the closed end is recentered and the open end is faced and chamfered at a 45 deg. angle. Rapid advance to the feed position on this machine is almost instantaneous and the cutting operations are carried on at a very high peripheral speed. Finish turning of the O. D. and ring lands, finish forming of the ring grooves and chamfering and finish facing of the ends are done in a second set-up in a battery of Sundstrand 10-in. automatic Stub lathes equipped with three cam-bar operated slides, front and rear and an auxiliary vertical slide. In both these lathe operations carbide tools are employed.

Rough grinding of the O. D. and finish grinding follow in a battery of Cincinnati 10 x 18-in. hydraulic piston grinding machines employing 20 x 3-in. wheels. This piston is the new Nelson Bohnalite "Autothermic" type which incorporates

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DRILLING, reaming and milling operations are combined in this special Greenlee machine with 8-station trunnion fixture. The angular heads drill two bleed holes in the rod.

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thermostatic elements of steel and aluminum alloy. In manufacture, the skirt is ground oval, but at operating temperature it takes on a cylindrical shape when the elements assume a curved form owing to the difference in expansion between steel and aluminum.

The center boss is later faced off in a Leland-Gifford single-spindle drill. The piston is then ready to be core drilled for weight in an automatic Morris piston balancing machine. In this unit the weight of the piston on the pan of a scale determines how far the piston descends over the cutter which has a fixed upward

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IN this double end Davis & Thompson Roto-Matic, the piston pin hole is drilled and reamed successively. Trunnion fixture holds eight rods, which are clamped by hand.

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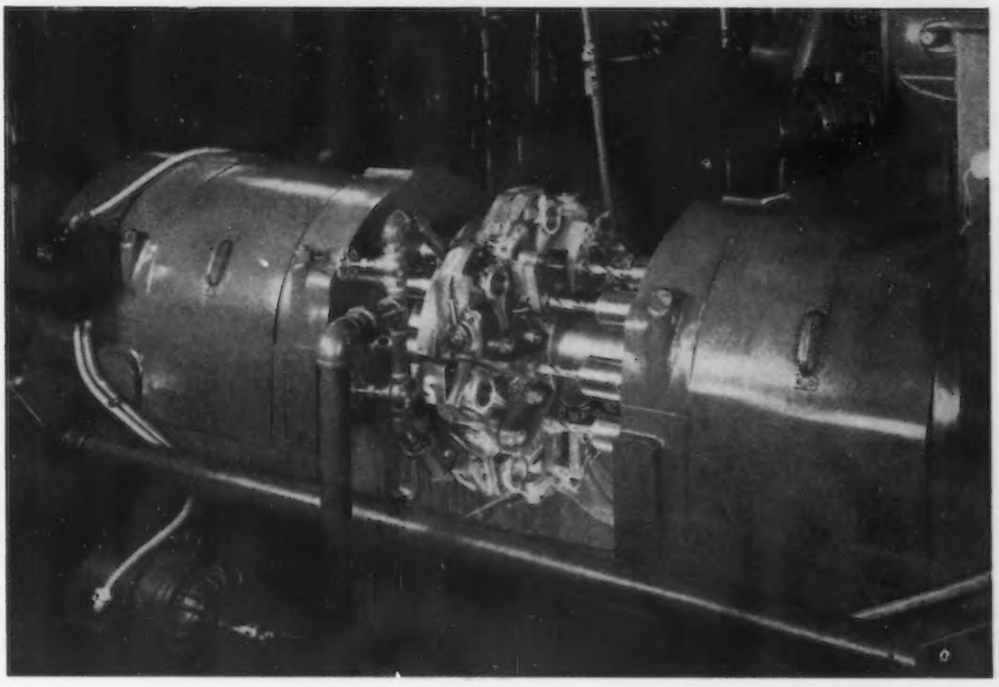

travel. Obviously the piston is clamped rigidly in place, once the balance ceases to oscillate, and upon relieving the clamping pressure the balance scale should revert to zero to indicate that the piston matches with the standard.

Packard tin-plates its pistons by means of an acid dip, in which no current is used. This operation follows after all burrs have been removed and the piston washed

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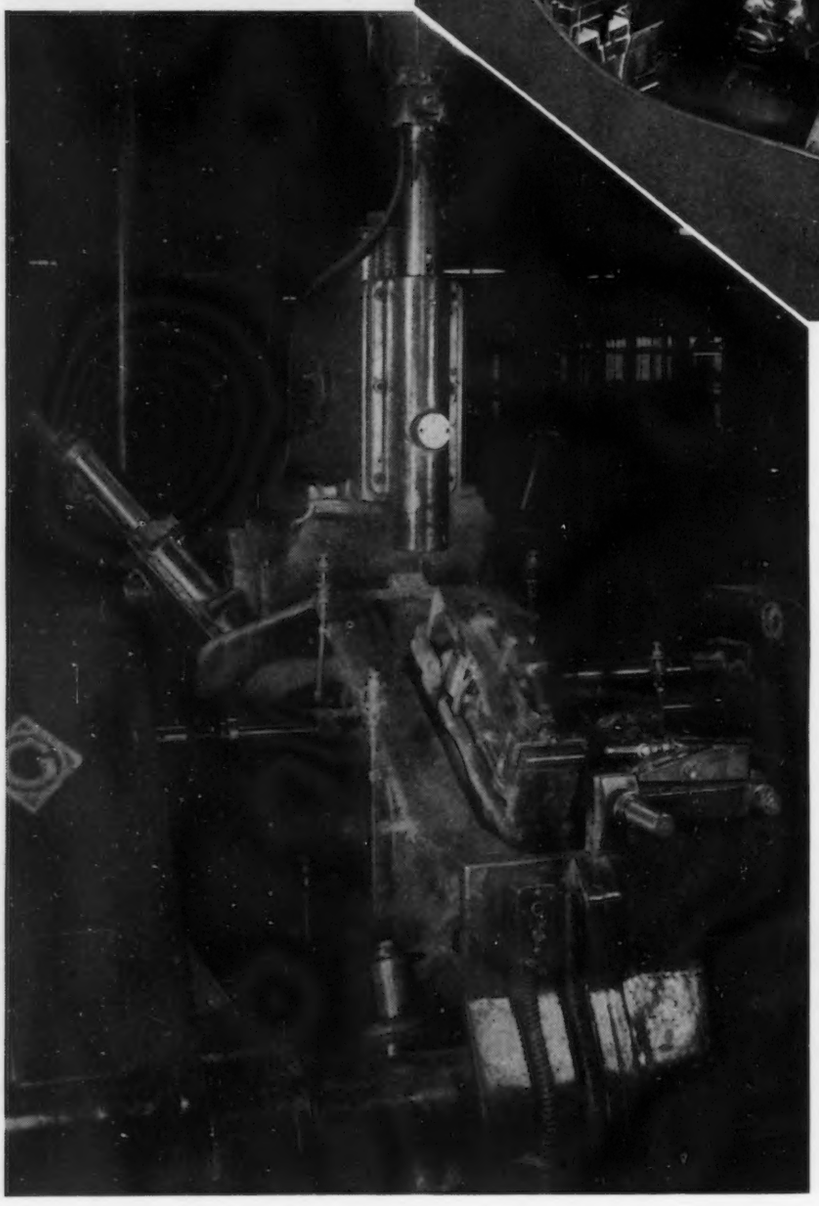

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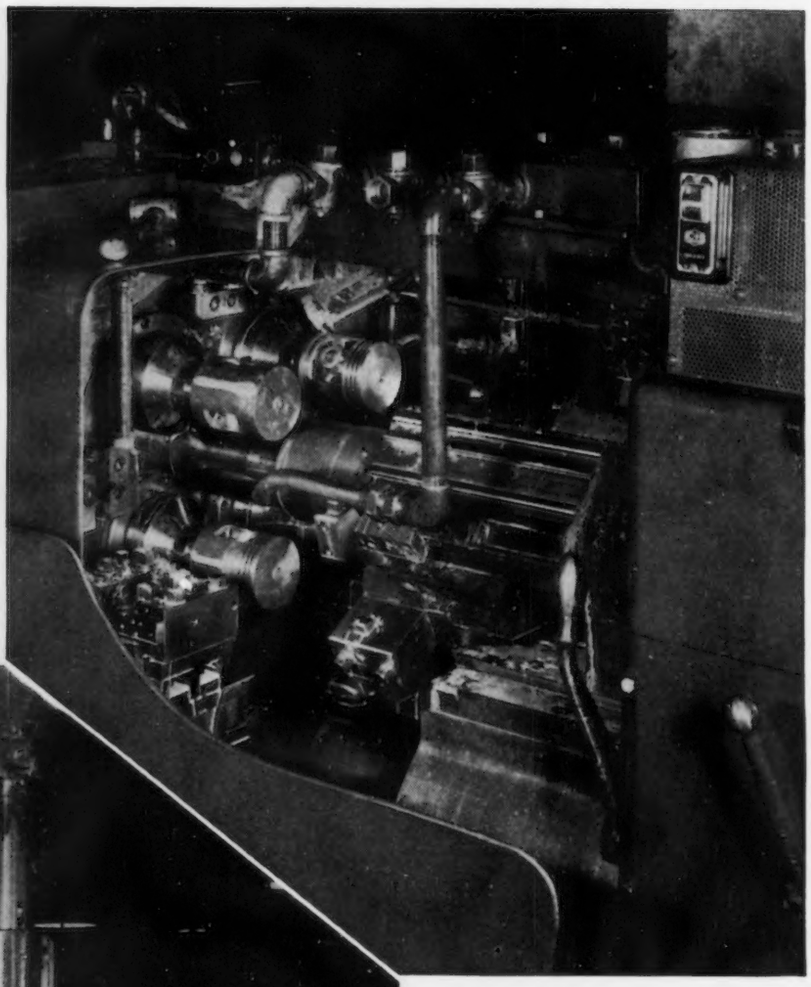
MORE diverse operations are combined in this machine than any other in the Packard plant. This Greenlee unit has core drills, internal grooving tools, three saws and two angular drill units carried on quills with flange mounted motors at the top.



ABOVE

PRODUCTION has been tripled and one operation and one handling has been eliminated by performing all rough turning operations on the piston in one set-up in this New Britain-Gridley automatic chucking machine.

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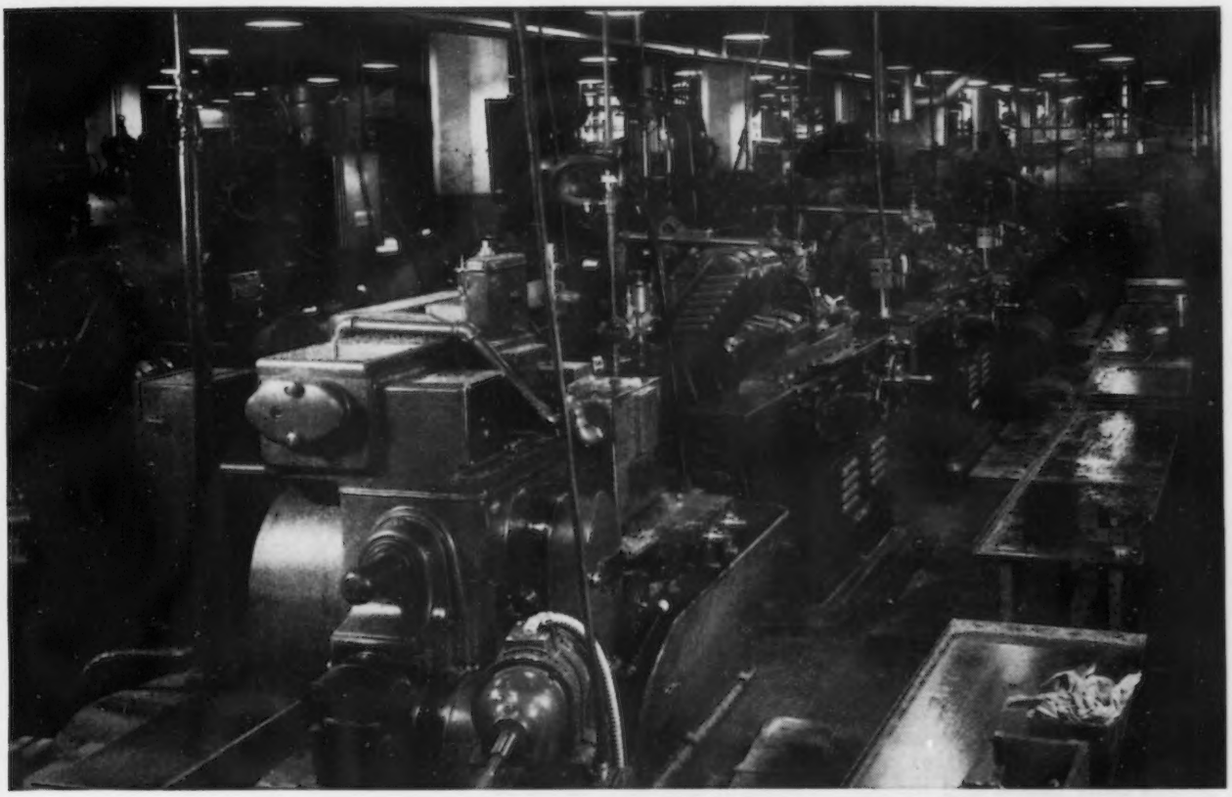
and inspected. Prior to plating, the piston is given an alkali wash and a cold water rinse.

There then remains one machining operation—diamond boring of the wristpin hole, which is done on an Ex-Cell-O machine very similar to the one used for diamond boring the small end of the connecting rod, except that a tungsten carbide tip is used. In this machine the pistons are loaded, dome downward, in hardened and ground bushings and against two locating buttons in the bottom of the fixture. Two pistons are loaded at a time and to line up the holes, locating fingers are mounted on a swivel bracket which is swung into position. When the correct posi-

tion is found, an equalizer clamp operated by a jig lock swings down and clamps the open end of the piston. The swivel bracket supporting the locating fixture is between bosses. At the finish of the cut, there is a dwell and a brake is applied, bringing the spindles to a stop before the tools are withdrawn. A straight score in. per rev. and finish feed is 0.0015 in. Finish stock removal varies between 0.008 and 0.010 inch.

There remains only to wash the



ABOVE

ONE of a battery of high-speed Sundstrand automatic lathes used for finish turning pistons. In the background may be seen a new battery of Cincinnati rough and finish grinders.

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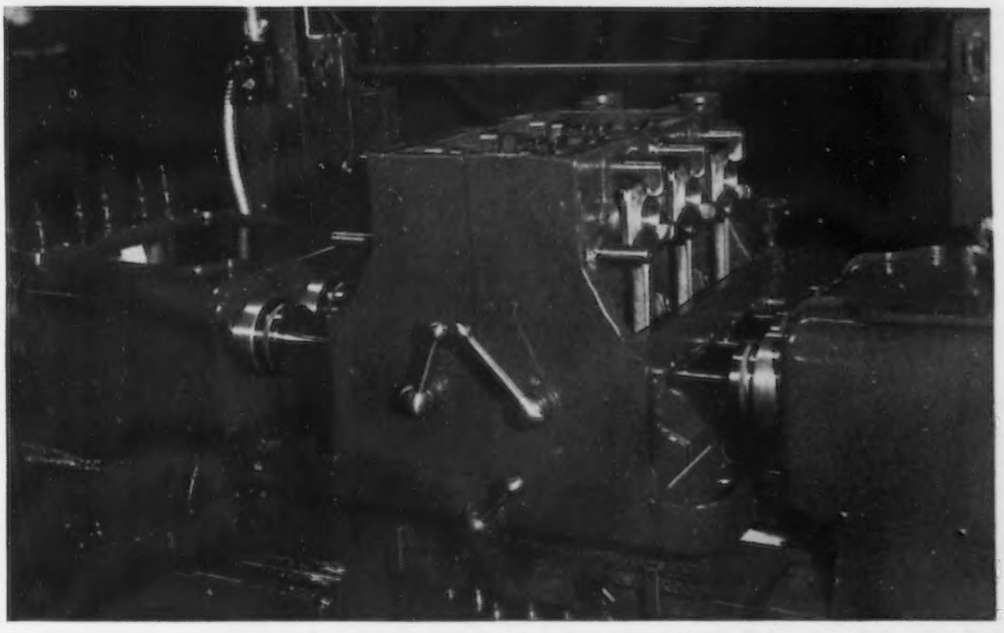
PARTICULAR attention has been paid to clamping the connecting rod assemblies in this Ex-Cell-O precision boring machine, while the piston pin bushings are diamond-bored. One head performs rough boring, the other finish boring.



counterbalanced and automatically pulls out its plugs and swings out of the way. On this two-way machine one head rough-bores and the other finish-bores. Both employ jump feed at rapid traverse mark of immeasurable depth is left. At the completion of the stroke, the pistons are ejected by a hand lever working through the two locator buttons in the bottom of the fixture. Rough feed is 0.004 piston in oleum spirits and to blow it off. This particular line is made up entirely of new equipment and represents the best practice that can be found today for the manufacture of automobile pistons.

THE BABY CUPOLA

THE potentialities of a baby cupola and the operating technique are described in this article, which was extracted from a manuscript appearing in *La Fonte* by the *Foundry Trade Journal*. The author, Guy Hénon, reviews how high-quality irons can be produced in miniature units, and, also, presents the dimensions and construction data for several types of cupolas. It is stated that, provided the raw materials are homogeneous and of exact composition and properties, the irons so obtained will be both economically produced and of improved quality, as compared with the same irons melted in a full-sized cupola.

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USERS' specifications for cast irons, when they are exacting, do not always involve considerable tonnages. As a result, a foundry today has to prepare, in a single melt, several widely differing qualities of iron, each having to conform within narrow limits to the tolerances stipulated. Obviously, and the fact has been remarked upon on several occasions, in practice it is very difficult, with an ordinary cupola, to obtain at one and the same time reasonable costs, a high-duty cast iron to buyer's specification, and a short delivery time with a small tonnage, as many clients demand of iron-founders. Many producers, therefore, have at their disposal, in addition to the ordinary cupola, melting equipments which enable them to produce in small quantities a metal of known good quality at a price which, if not low, is at least acceptable. These melting plants are the crucible, the small oil-fired rotating furnace, the electric radiation furnace, and finally the baby cupola. It is the last-named with which this article is concerned, and it will be shown that it fits in very well with the requirements noted above.

Lighting-up and running of a baby cupola are very simple, and are quickly effected. The thermal efficiency is equal to that of the large cupola, but the expense of bed coke is less.

Where several different quality irons are to be melted, the amount of "change-over" iron will be small, and will, therefore, be easily taken care of by the actual tonnage paid for.

The very low starting-up costs allow the production of limited quantities of iron in the baby cupola under favorable economic conditions. Some of these baby cupolas are worked on the basis of 220-lb. melts. The iron produced with these conditions is of normal quality, which would not be the case if so small a quantity were melted in a full-sized cupola.

The possibility of making small melts eliminates the necessity of waiting for an accumulation of several small orders for any particular grade of iron. These orders, if urgent, can be fulfilled as and when they are received. Further, the ease of starting up and running enable the baby cupola to be put into commission at the most favorable time for prompt delivery—for instance, with a very urgent order, at the moment when the molds have just been

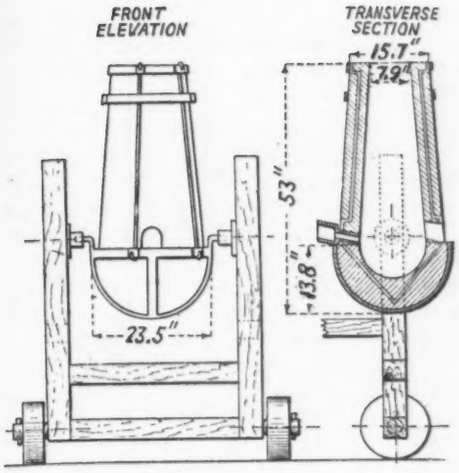

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FIG. 1—Baby cupola used by Réaumur for melting malleable cast iron.

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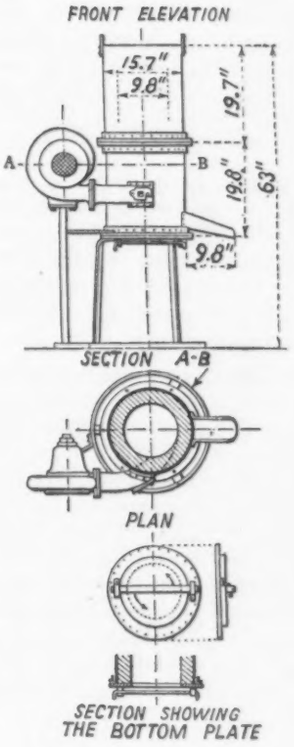
BELOW

FIG. 2—Girardet cupola. This unit has an output of about 440 lb. per hr.



closed. The baby cupola, in fact, can be worked in the interval between the tapping of the ordinary cupola or even at the same time.

Iron of Exact Composition

The technical advantages of the baby cupola are, in general, less known than its economic advantages; yet it is possible to produce cast irons of precise chemical composition and very high quality. In fact, in addition to the ease of separating the charges, a baby cupola results in less chemical and physical alteration to irons charged therein than would be the case in a cupola of larger capacity. In this connection the following figures relate to a baby cupola of 15.7 in. internal diameter:

Carbon pick-up.—A charge made up wholly of low-carbon pig iron containing 2.5 to 2.7 per cent C was tapped from the cupola with a carbon content varying from 2.9 to 3.2 per cent.

A mixture of mild steel turnings and medium-phosphorus iron resulted in an iron carrying 2.6 to 2.8 per cent carbon.

A mixture made up of two-thirds mild steel and one-third high phosphorus iron yielded iron with 2.3 to 2.6 per cent carbon.

The same charges melted in a large-sized cupola without a receiver and with normal blowing undergo carburization of about 0.3 per cent above those just cited.

Silicon and manganese losses.—The successive analyses of a phosphoric iron remelted a large number of times in a baby cupola have previously been noted by the author in a paper read before the French Foundrymen's Association. It is interesting to point out that, while the iron retains a normal composition and structure, that is to say, during the first melts, the losses in silicon and manganese remain relatively small. The losses over the first five melts of 3.8 per cent for silicon and 9.5 per cent for manganese are considerably lower than the losses generally encountered under identical conditions with a cupola of larger dimensions.

Sulphur pick-up.—In the course of the same experiments it required nine successive meltings in order for the sulphur content, which initially was 0.029 per cent, to exceed 0.10 per cent. As a corollary to previous observations, it is permissible to state that the mechanical qualities of a high-strength pig iron remelted in a baby cupola undergo alteration of less important order than that which results from melting in a large cupola. Practical experience confirms this theory. It can, therefore, be said that with the baby cupola irons can be produced the quality of which is distinctly superior to those of irons produced by an ordinary cupola.

Practical Limitations

The use of baby cupolas is restricted because of the following considerations:

One can only pour small castings with a weight of the order of 220 lb.

The small hourly production does not provide facilities for the execution of sizable orders. This plant, therefore, can only be envisaged as "doubling" a larger cupola, its scope

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FIG. 3—Cupola installed at the Foundry Technical Institute at Aix-La-Chapelle, France. The hourly output is about 880 lb.

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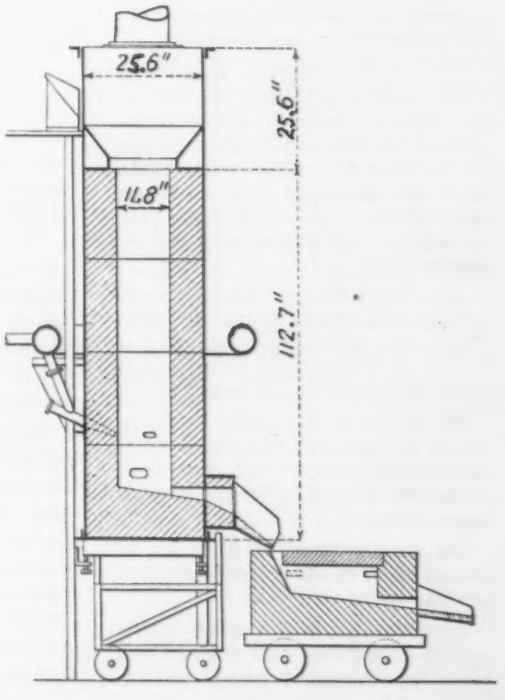


being limited to the meeting of urgent orders and producing small castings of high-quality cast irons.

The iron tappet is not always of perfect homogeneity when the charges themselves are heterogeneous. With charges of steel-mix iron, differences of 0.3 per cent in the silicon contents of castings poured from the same melt may be found. It will be shown later how this variation, which is too great for certain applications, can be reduced.

Finally, the running of the baby cupola and its maintenance present certain difficulties which are not always insurmountable.

The ironfounder wishing to install a baby cupola can turn to a specialist who will deliver an efficient unit at a very modest price. If, on the other hand, the founder is governed by strict economic considerations, he can construct it himself. In the following paragraphs and the accompanying illustrations are given hints capable of guiding the ironfounder in his choice on the essential construction details. This account, it will be understood, has been limited to the peculiarities of the baby cupola. It should therefore be taken only as supplemental to data published on full-sized cupolas, in particular the papers by Ronceray.

Construction of Baby Cupolas

The essential characteristic of these plants is a small output, hence a small internal section and consequently a reduced blast. It is not possible for a workman to get into the interior of the cupola to carry out repairs. This must be taken into account, and use made of one of the two following arrangements:

(1) A short cupola, measuring 6.5 ft. maximum from top to bottom. Repairs can then be made by introducing the arm and shoulder at one of the two ends. This length of 6.5 ft. is not too short, and there are users of baby cupolas who have gone even below this without any real inconvenience.

(2) A cupola built up of several sections placed one above the other. These sections can be dismantled in a number of ways, the following arrangements being customary:

An upper part capable of being raised by cams or jacks and a lower part mounted on a truck capable of being moved away after the top has been raised.

An upper part which can be drawn away on a truck or on a roller path after raising.

Several circular sections which can be dismantled and reassembled after repair by the simple maneuvering of an overhead crane, as with the cope of a mold.

In many cases the cupola terminates at the level of the charging mouth. Where possible it is advisable to provide above it a shaft to eliminate fumes and protect the workmen from the flames, which are much in evidence when the cupola height is small.

The diameter of the melting equipment should not exceed 19.7 in. Some ironfounders have made it smaller, approaching the dimensions of the apparatus used by Réaumur (Fig. 1), of which the diameter was about a foot. The baby cupola successfully employed by Girardet (see Fig. 2) has a diameter of 9.8 in. with a total height of 39.5 in. On the other hand, in the technical press, and especially in America, there are found examples of baby cupolas with diameters ranging from 11.8 to 17.7 in.

The cupola in the experimental foundry of the Foundry Research Center (Fig. 5) has a 15.7 in. diameter and gives excellent results. This diameter is definitely recommended for a plant intended to meet industrial requirements.

The height above the bottom plate of the cupola depends upon local conditions and generally can be 27.5 in. The sand bed is 4.7 in. thick. The tuyere level is as low as possible, taking into consideration the largest castings to be made, to reduce the time the iron remains in the well. The distance of about 9.8 in. between the bed and the bottom of the tuyere is suitable in most cases. The slag hole is located slightly beneath the level of the tuyere and opposite the tap hole.

Tuyeres and Blast

Some builders provide several tuyeres on their baby cupolas. This arrangement allows of a symmetrical blast but favors the formation of a "crown." As long as the cupola diameter is under about 19.7 in. the author prefers a single tuyere, which gives very good results and simplifies considerably the building up of the cupola casing by cutting down the wind box.

The piping should, as far as possible, incorporate a bend permitting observation of the tuyere and poking. It is advantageous if the tuyere be sufficiently large to allow a workman's arm to be inserted. One can then make up, from the tuyere, the bed and the tap hole, which dispenses with the provision of a lighting up hole.

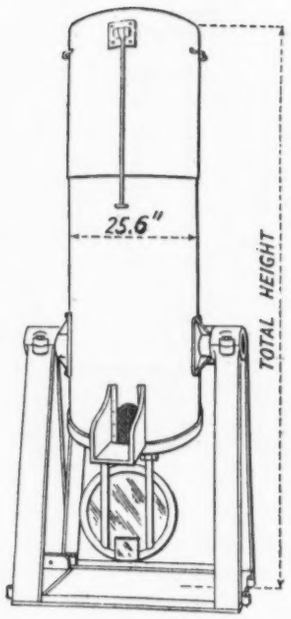


FIG. 4—Whiting cupola for an experimental foundry.

The tuyere should have a section at least equal to an eighth of the cupola section. This corresponds to a round tuyere of 5.5 in. diameter for a 15.7-in. cupola.

For a 15.7-in. cupola an air feed of about 17,750 cu. ft. per hr. is suitable. A great blast is unnecessary, even when low-carbon irons have to be produced. The pressure in the belt in the vicinity of the tuyere should be between 4.7 and 7.9 in. water gage.

If the cupola height is small, the pressure must be kept down to 4.7 to 5.9 in., otherwise there is abundant sparking from the mouth. If conditions dictate, the blast can be derived from a branch from the air belt of a large cupola. This saves the purchase of a fan, but at the risk of irregular working, because the reduction of volume and pressure of the blast is difficult to secure in a constant and exact manner.

Shell and Lining

The external dimensions of the cupola are only of small consequence if it is lined with a plastic refractory, which material the author recommends. One can then, without inconvenience, use ring plates, so that, when shaped, their diameter is at least 27.6 in. for an internal diameter of 15.7 in. These plates, if desired, can be made of cast iron. In this case it is an advantage from the point of view of molding to replace them by square boxes, even using suitably sized molding boxes

which will be rammed with plastic refractory so as to avoid joints, if it be desired to make a cupola easily dismantled.

In the majority of cases it is best to make this of plastic refractory. Good quality refractory must be used, prepared in a sand mill and used with the minimum of water compatible with good cohesion. It is packed by rammer around a suspended template so formed as to provide a guide to ensure concentricity. Ramming is carried out by a hand or pneumatic rammer; it should be as hard as possible.

The template can be replaced by a simple wooden framework, representing approximately the internal profile of the cupola. This is dismantled after ramming or simply left in place to be burnt away. The refractory is dried slowly, first by wood and then by a coke fire.

This lining, after each melt, receives essential repairs. It is not worth devoting too much time to repairing, because it is more expeditious completely to reline the cupola when it is at all seriously worn. Actually, this task can be accomplished in a few hours by an experienced worker.

The bed is made up exactly in the same way as with large cupolas. The finishing off is carried out through the tuyere, as explained previously.

Operation and Applications

For a 15.7-in. cupola, the charge is about 220 lb., with 22 to 26 lb. of coke, varying with the nature of the metal charged. The limestone charge weighs 6 to 8 lb. It is useful to add fluorspar or glass, so as to assure the regular running-off of the slag and the cleanliness of the refractory at the end of the melt. This addition, however, should be limited to the last few charges. The coke should be broken into pieces of 2.4 to 3.9 in.

If the metal charge is heterogeneous, there is reason for maximum breaking up. Pat Dwyer advises for the coke, and without doubt for the iron too, pieces "as large as eggs." Réaumur went further and specified pieces as large as crowns (coins). The difficulty of breaking is an important reason to give preference to homogeneous raw materials. In general an electrically smelted pig iron carefully analyzed represents the ideal.

Large pieces can then be charged without trouble. Charging should be done without roughness, for the lining is relatively weak. The charges should be arranged methodically in order to avoid scaffolding, which is very prone to occur and contributes to the rapid destruction of the refractory. When scaffolding occurs despite the precautions adopted, invariably it takes place very close to the mouth, because of the small height of the cupola, and it is an easy matter to break it down with the aid of a poker.

Constant inspection of the tuyere, to avoid slag or iron running into it, should be observed. The cupola well is quickly filled, because of its small dimensions.

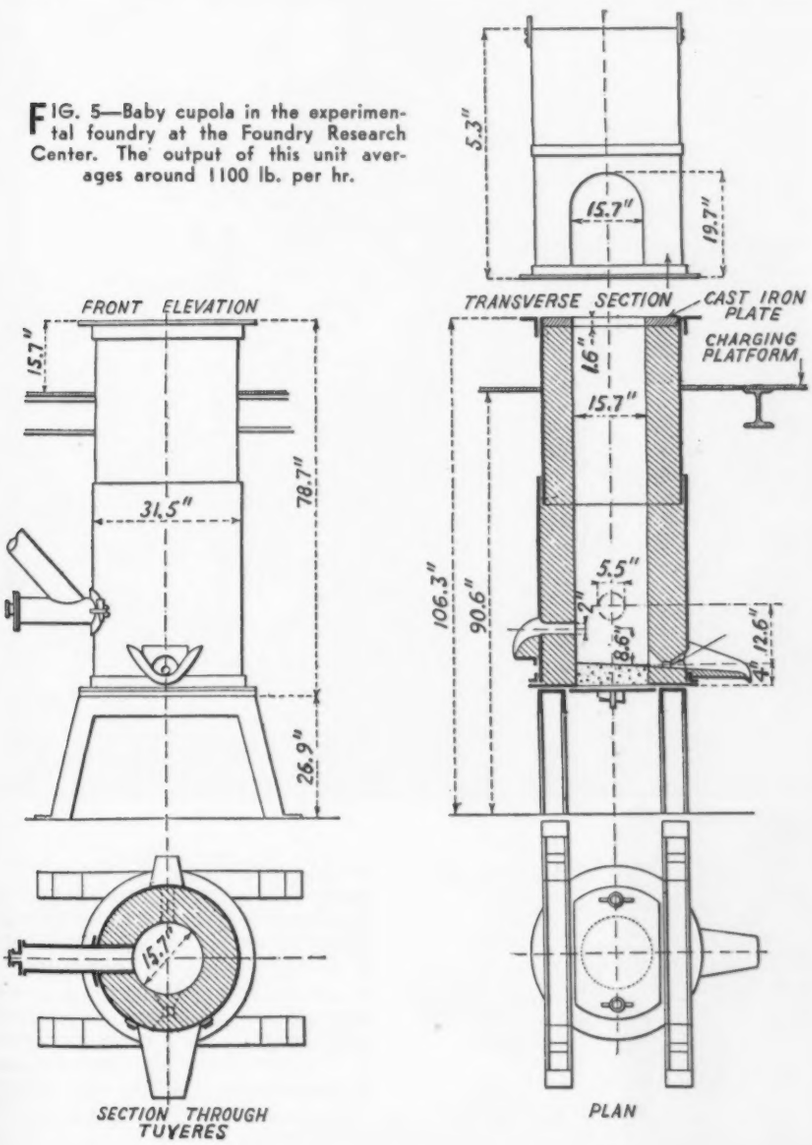
The above hints, added to the standard rules for the running of cupolas, will enable the iron founder to produce regularly an iron of definite composition and hot enough to pour quite thin castings in mixtures with little "life" (pearlitic iron, for example).

The author cites the example of melting the austenitic Ni-Cu-Cr iron Ni-Resist in the baby cupola. The properties of this metal are well known. They include heat resisting properties, resistance to most forms of corrosion, a degree of malleability in the as-cast state and certain electrical and magnetic properties. The obtaining of these qualities is governed by a definite chemical composition which carries considerable percentages of special additions (more than 20 per cent of the total being nickel, copper and chrome).

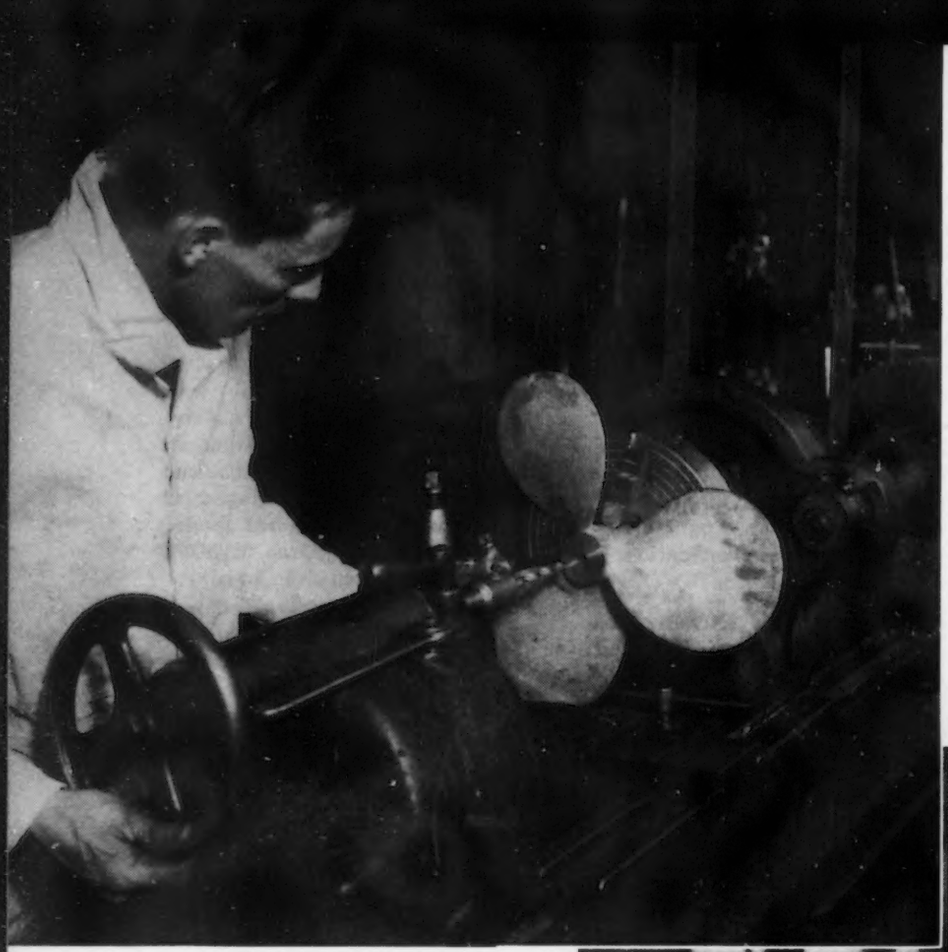
Melting is accomplished generally starting with ingots of Ni-Resist, this method having been shown the most exact and economic. For the preparation of the ingots one can use the crucible, the small rotating oil furnace, the electric furnace or the cupola.

(CONCLUDED OF PAGE 89)

FIG. 5—Baby cupola in the experimental foundry at the Foundry Research Center. The output of this unit averages around 1100 lb. per hr.



Making Monel



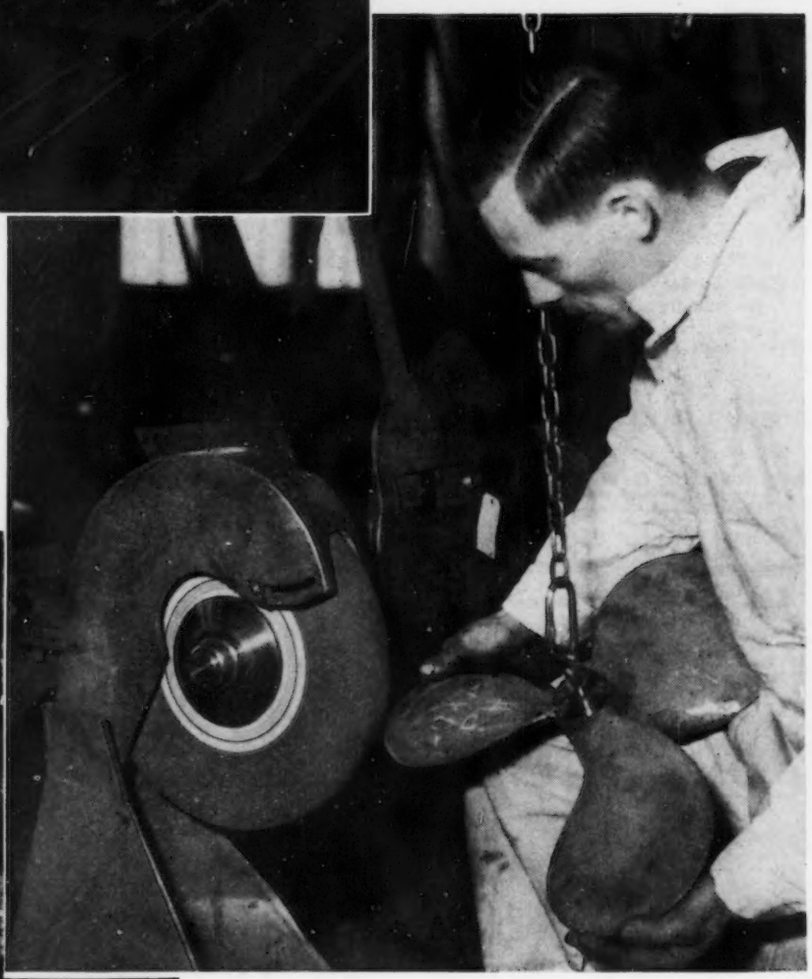
BELOW

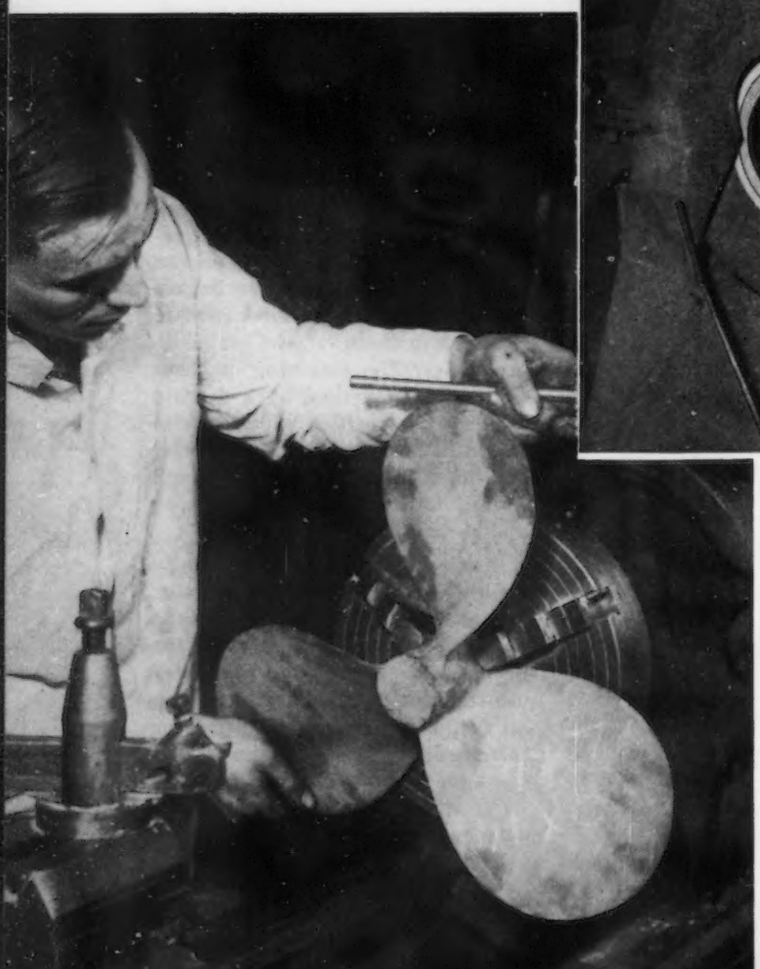
THE rough casting is first chucked in a lathe, then centered and faced.

o o o

ABOVE

THE shaft hole is next drilled and reamed.





o o o

ABOVE

HAND grinding imparts the first step in face finishing.

o o o

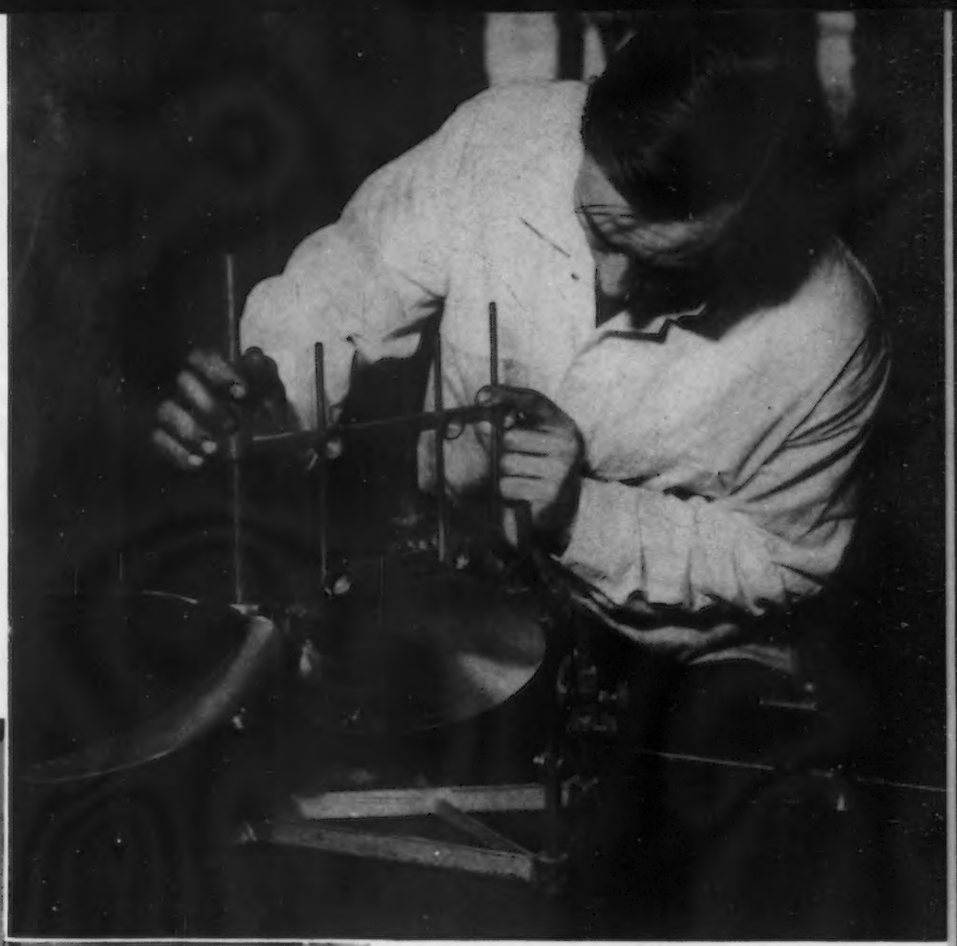
WHILE individual manufacturers have turned to various alloys for special propellers in the past, the practice generally has been to use bronze for standard units for the motor-boat.

Development of the Monel propeller shafts some years ago turned the attention of manufacturers to this nickel-copper alloy for the propellers themselves. A number of these wheels have been made for special duty on boats such as the patrol craft of the U. S. Department of Commerce's steamboat inspection service. A particularly difficult combination of conditions is encountered by these boats which require wheels of great strength and toughness. Those of softer alloys demanded replacement at frequent intervals, thus laying up the vessels at a time when their services were most needed.

Boat Propellers

The Monel wheels revealed the same resistance to deformation when hidden obstructions were encountered that the Monel shafts did and almost entirely eliminated the need for replacement or repair. On certain crafts of the Army engineering service, where exceptionally severe conditions in harbor water also are found, Monel wheels have been in use for more than four years without need for repair.

Partly on the basis of such performance and partly because of the general acceptance of Monel shafts by motor-boat owners, the Columbia Bronze Co. has begun the production of stocks of Monel wheels in a variety of standard sizes. These wheels are produced from foundry castings, machined and finished to precise degree in the company's shop at Freeport, L. I.



BELOW

STATIC balancing is important to eliminate vibration.

o o o

ABOVE

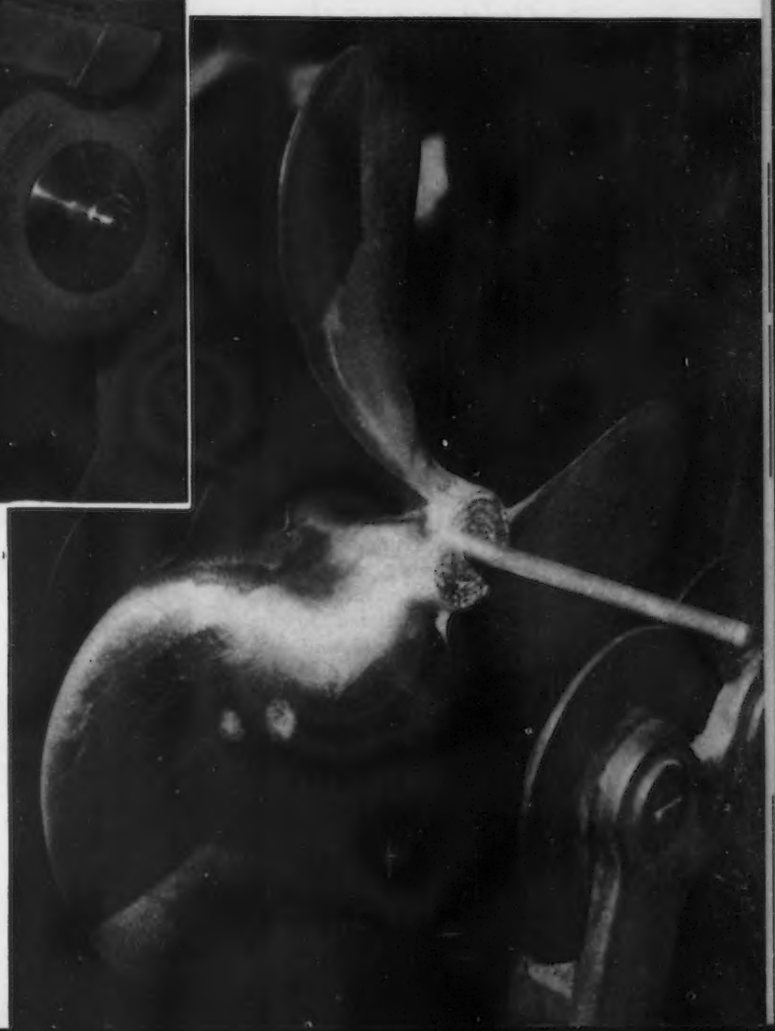
FINALLY comes the pitch test, made in an ingenious fixture.

o o o

ABOVE

NEXT, the propeller is polished.

o o o



THIS WEEK ON THE ASSEMBLY LINE

. . . Production faltered only slightly when Chrysler assembly lines came to stop last week.

o o o

. . . Practically all of workers' demands granted in settlement of Midland Steel Products Co. sit-down strike.

o o o

. . . Only present threat to high automotive sales and output is Pittsburgh Plate Glass situation, now in its seventh strike week.

o o o

. . . General Motors formally opens its stamping division at Grand Rapids, employing 2100 workers and shipping 28 carloads of stampings a day.

DETROIT, Dec. 8 — Detroit breathed a whole lot easier last Saturday morning following the settlement of the stay-in strike at the Midland Steel Products Co. plant. Chrysler had been severely crippled by the shortage of frames from this source, and by Wednesday noon of last week had shut down all its assembly lines. It continued to make motors, transmissions and other components up until Friday evening, when a general order was issued to close down all Chrysler operations indefinitely. Parts suppliers were given hold-up orders, although Chrysler continued to receive steel on its present commitments. As a result of the strike solution, Chrysler decided to resume operations on Monday morning at Dodge and Plymouth and on Tuesday morning at the DeSoto and Chrysler plants. Briggs Mfg. Co., which had also shut down owing to their inability to ship bodies to Plymouth and Dodge, resumed operations on Monday.

Neither Briggs, which did hold up shipments on steel, nor Chrysler is yet out of the woods so far as the labor situation is concerned. The shortage of plate glass as a result of the six weeks' old strike of 6000 employees of the Pittsburgh Plate Glass Co. had already begun to be felt in both organizations. In fact, the Federation of Flat Glass Workers started a sit-down demonstration at the Libbey-Owens-Ford Glass Co. plant at Ottawa, Ill., last week because they had heard that a $4,000,000 Chrysler order had been shifted to that plant. They were assured, however, that all glass being made there was for General Motors cars. All is quiet on the Toledo front, where the largest proportion of automotive glass is made by L-O-F for General Motors. The company recently announced a bonus of $100 to be distributed to each employee, $50 just before Christmas and $50 at the beginning of the vacation period next summer. The company has enjoyed friendly relations with its organized workers for a good many years and it was rather a shock to learn of the sit-down affair at the Ottawa plant. The contract with L-O-F workers will be up for renewal Dec. 16. Pittsburgh Plate Glass Co. workers sat down a week before the expiration of their contract on Nov. 1, demanding a closed shop or a preferential union shop with the "check off."

Incidentally, this Flat Glass Workers Union is a member of Lewis' C.I.O., which is attempting to organize rubber, glass, steel and automobiles at the same time. It is also significant to note that a United Rubber worker delegate and a United Miner delegate both sat in for the C.I.O. on the negotiations in connection with the Midland affair.

Speaking of glass reminds us that the Ford Motor Co., as in so many of its operations, is in a

position to make at least a part of its requirements, roughly estimated at 50 per cent. As a further hedge against glass troubles, Ford has huge banks of glass stored at the Rouge works in case the outside source of supply should fail.

Ford Only Slightly Affected

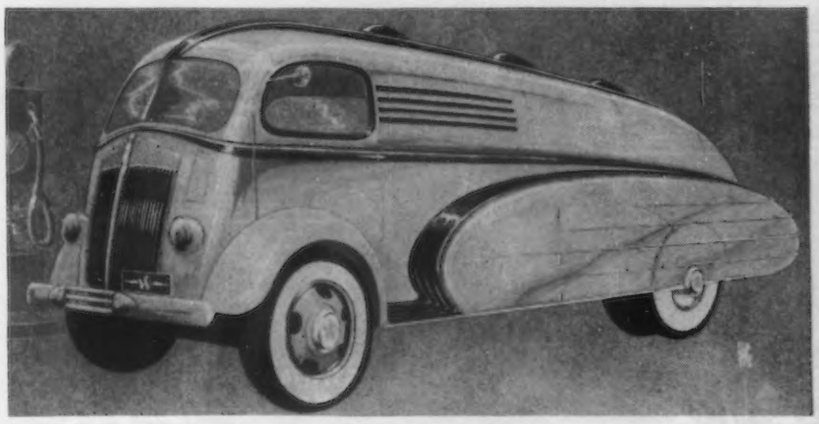
Ford was affected only to a minor extent by the Midland Steel Products difficulty, since this company furnished Lincoln-Zephyr frames. Last Friday a fleet of trucks came over from Ford Motor Co. to pick up Zephyr frames in the yard of Midland Steel and to pull out the dies. Workers moved a large part of their picket force out into the yard to protect these supplies and for a moment it looked as though trouble might start in real earnest. When the Ford contingent was informed, however, that negotiations were about completed in the settlement, the trucks withdrew and everyone breathed easier.

The basis of the Midland Steel Products settlement was an increase in hourly rates, the abandonment of piece rates, and time and a half for work over 45 hr. Every base rate in various classifications has been increased 10c. an hr., and men workers will receive a minimum of 66c. an hr. This settlement brings out rather clearly the difficulties that are bound to crop up from time to time as a result of the wage differentials between the large corporation shops and the parts suppliers. The average hourly rate paid in 48 leading automotive parts plants for the first 10 months of this year was 67.4c. Hourly rates in General Motors and Chrysler plants are somewhere between 80c. and 85c. an hr. Ford Motor Co. pays a minimum of 75c. an hr., but a very large percentage of workers are at this rate. It is interesting to speculate just how far automotive buyers will go in protecting their parts suppliers when the latter are faced with drastic wage increases of this kind. Most contract parts business is written on a six-months' basis. Whether it will be the Midland Steel Products who will hold the bag or whether Chrysler will permit increases in frame prices is speculative at the present moment.

One thing seems fairly clear, however, and that is that the gesture indicated by the shut-down order (later rescinded) on all Chrysler plants last Friday was a move in the direction of backing up the Midland company in its fight, since the throwing of 65,000

TRUCK streamlining is going ahead of passenger cars, as seen in this new Model 805 White cab-over-engine truck designed by Count Alexis de Sakhnoffsky, streamline stylist who works exclusively for the White Motor Co. in the truck and bus field. One of the mechanical innovations is the forward position of the front axle to give 1/3 weight distribution at the front and 2/3 at the rear, with short overall length. Wheel tread is almost 80 in.

ERRATUM—In the caption on this page last week it was stated that the Oldsmobile Six grille was made of thin gage stainless steel. Actually the bell-shaped louvers are die castings, chromium plated, although stainless had been tried out experimentally. Chrysler, however, has adopted stainless facings on mild steel stampings.



Classification of Work
Automotive
Piece Name - Rear Axle
Driving Gear
Material - H.R. Steel

First Chucking
Operations:

1st Sta. - Unload and Load.

2nd Sta. - Drill, Rough Turn and Rough Face.

3rd Sta. - Drill, Semi-Finish Turn and Rough Face.

4th Sta. - Rough Face, Rough Chamfer and Rough Groove.

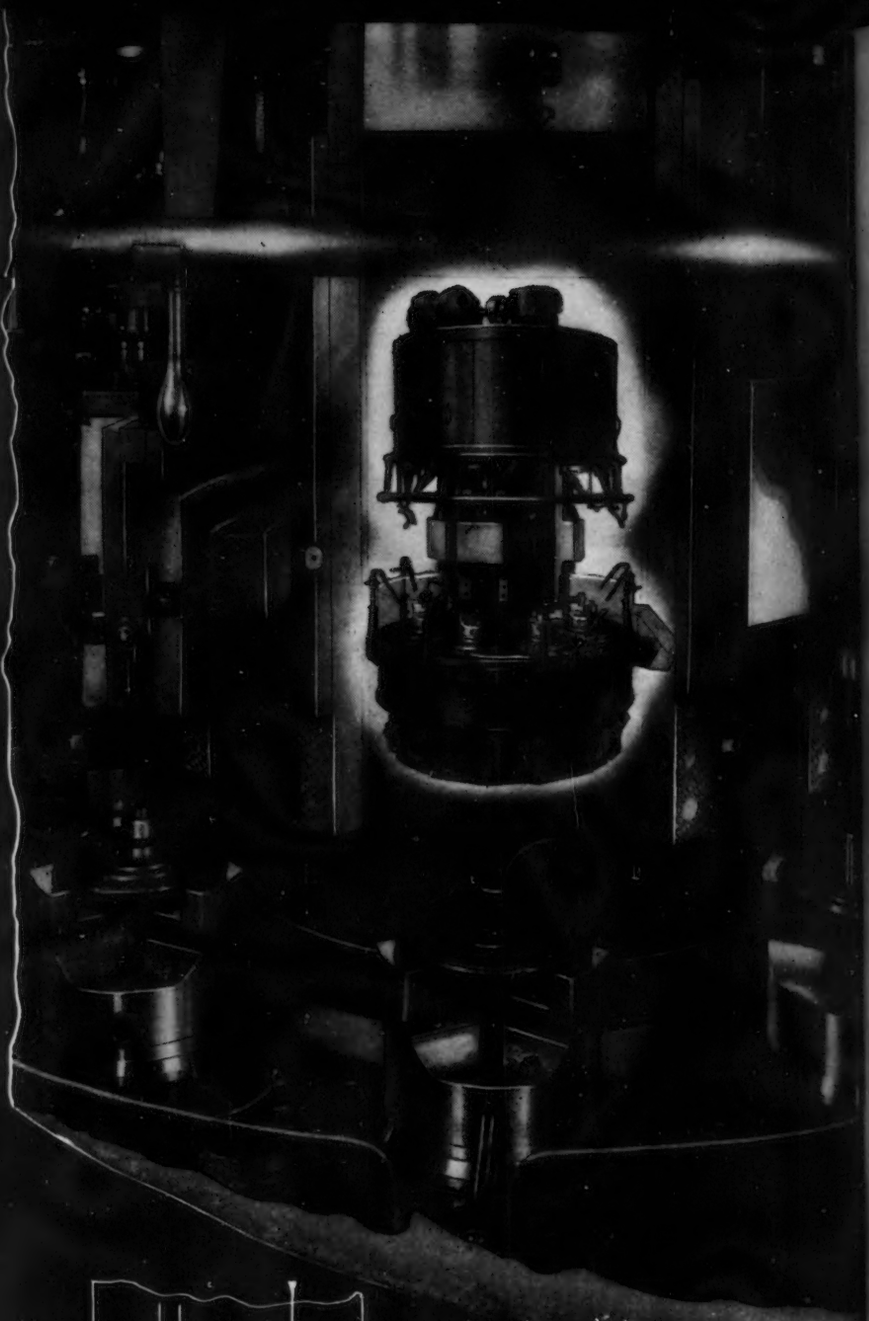
5th Sta. - Chamfer and Finish Groove.

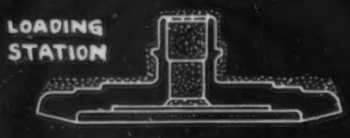
6th Sta. - Finish Face and Chamfer.

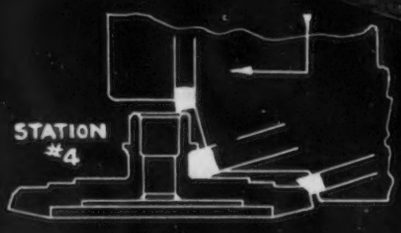
7th Sta. - True Bore, Finish Turn, and Chamfer.

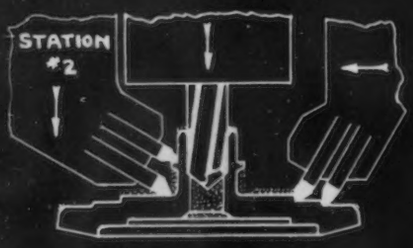
8th Sta. - Finish Turn and Ream.

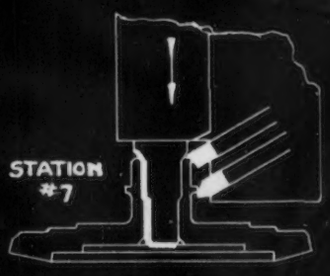
Time per Piece - 1 Minute
39 Seconds.

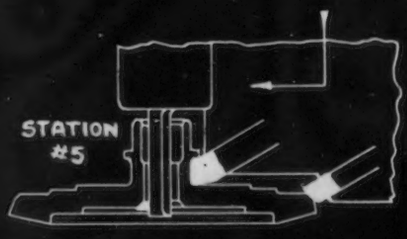


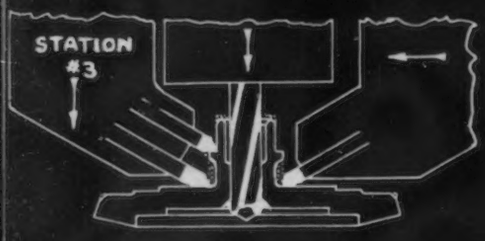


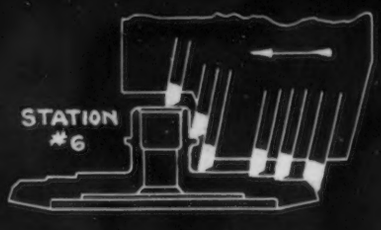


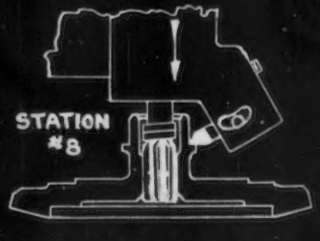












REAR AXLE DRIVING GEAR MACHINED ON 8"-8 SPINDLE TYPE "D" MULT-AU-MATIC

THE BULLARD COMPANY BRIDGEPORT, CONN.

people out of work because of a scrap involving 2000 workers in a parts plant would have dramatized to the public at large the responsibility to the city and to society as a whole that union leadership accepts when it uses the strike or sit-down weapon. It has generally been believed that Chrysler would continue to make banks of parts in order to be prepared for the spring sales drive, despite stoppages of assembly lines.

Whether this is the end for the present of strikes in automotive parts plants remains to be seen. A number of them have recently announced season-end bonuses, including both the Briggs and Murray body plants. That several important parts suppliers are fairly well organized by the U.A.W. seems to be true, and it is generally known that this union has a strong foothold in the Dodge main plant of the Chrysler organization. Union officials have indicated on more than one occasion that they are not out to tie up the industry, although they stand ready to "correct" specific situations. It seems apparent to some observers that a series of strikes and cessation of activity in the automotive industry would tend to defeat the main objective of the U.A.W., which is to organize the automobile workers. After all, what the average worker seeks is job security, and this is certainly not obtained by labor disturbances of one kind or another. On this basis it seems safe to predict that there will be no further immediate attempts by the union to whip the manufacturers into line unless, of course, local situations should get out of control of the union officials themselves.

Output Had a Small Drop

Because Chrysler had shut down most of its assembly lines by the middle of last week, production for the week ended Dec. 5 showed a decline from the previous week, although only a slight one. Ward's Automotive Reports estimates assemblies of passenger cars and trucks in the United States and Canada at approximately 101,660 units, as compared with 102,339 the week before. Chrysler divisions fell from 22,950 to 7750, whereas General Motors showed an advance from 42,895 to 52,900 cars. Ford's output came to 25,250 compared with 25,725 the previous week. For General Motors, last week's production is the highest for any one week this year, even including the peak of spring activity. Had Chrysler been able to show similar gains, a record week for the year would have been established.

Both Briggs and Chrysler had held up releases of steel last week, but these are now coming through and should build up to former volume by the end of the week.

Sales Breaking Records

Sales continue to break records all over the country, and nearly every manufacturer reports deliveries running behind current sales. Polk's estimate of November registrations is 225,000 units, whereas production estimates are approximately 320,000 passenger cars manufactured for the domestic market, so that the delivery situation should soon be balanced.

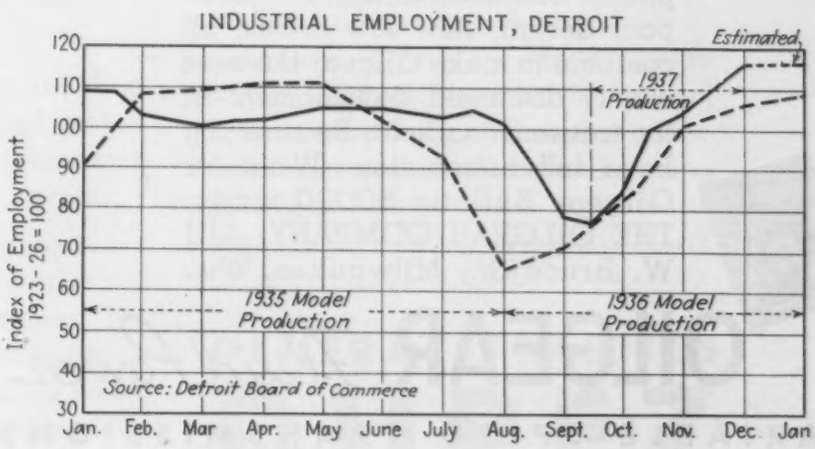
Chevrolet's November production of 112,229 cars exceeded that of any previous November in its 25-year history. Of this amount, 95,022 was domestic production. December schedules call for 150,000 units. Retail deliveries in the first 20 days of November were 76,939, an increase of 26.7 per cent over the corresponding period of 1935, which was the largest November in Chevrolet's history. Unfilled orders on November 20 were also the highest in Chevrolet's history, totaling 96,084, over double the number at the same time last year, in spite of the fact that the 1936 car was presented five days sooner than the 1937 model. Sales figures for Chevrolet's calendar year will be more than 1,150,000 as against 865,700 in 1935, an increase of 32 per cent.

In the eight weeks since the introduction of Hudson and Terraplane cars, retail sales have shown a gain of 32 per cent over the corresponding period of last year, factory shipments totaling more than 21,000 cars. Production schedules which had been accelerated in recent weeks were running close to 3800 cars a week. Fortunately for Hudson, it receives its frames from the Cleveland plant of Midland Steel Products Co., which was unaffected by last week's strike, although an attempt was made to picket the plant. Graham-Paige also reports a substantial increase in orders and now has a bank in excess of 7500 cars. Sales of the corporation's super-charged cars during October and November are more than five times as great as they were in the comparable period last year. Domestic retail deliveries of Buick cars during November, totaling 19,284 cars, established an all-time high for that month and marked a new peak for 1936. One would have to go back 10 years to get a previous November high, and it is 1500 units over the peak of April, 1936. High-priced cars in the Cadillac class are selling very well, also. Cadillac's December schedules call for 5700 cars, greater than any month in the history of the company, even 1929. During November 5007 cars were shipped and the increase in schedules has been made because the bank of unfilled car orders continues to mount.

New G.M. Stamping Plant Opened at Grand Rapids

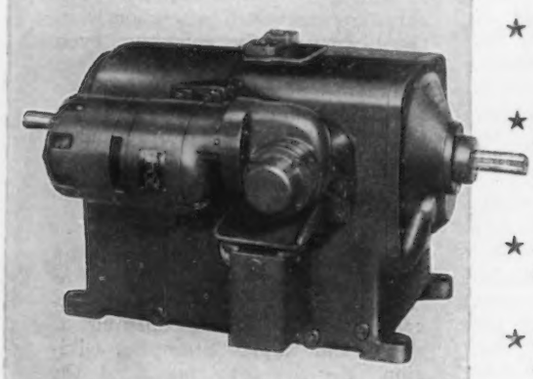
Last week the citizens of Grand Rapids honored the officials of General Motors Corp. upon the occasion of the formal opening of the Grand Rapids Stamping Division. As the toastmaster of the occasion mentioned, the announcement of General Motors' decision to build a plant in that city acted as a liniment to the aches and pains suffered by the community during the depression. William S. Knudsen, in commenting on the selection of Grand Rapids as a site for this stamping plant, mentioned the corporation's policy of decentralization and the fact that the city has many home owners, who are the ones to provide steady, reliable workers and are the greatest bulwark against things that might hurt industry. Grand Rapids' record of industrial peace is closely related to this widespread home ownership and the stolid character of its Dutch descended citizens.

This newest G.M. unit, which is operated by Fisher Body, is now



employing approximately 2100 men and is shipping 28 carloads a day of stampings. Practically all of these workers were recruited locally with the exception of the supervisory staff. Grand Rapids, despite its reputation for furniture, is a fair-sized metal-working center and in both industries skill and accuracy are paramount, so that General Motors could build a mass production industry on this solid background of inherent skill. An apprenticeship program has been started, however, to assure a steady supply of skilled workers for the large die shop.

Alfred P. Sloan, Jr., president of the corporation, in speaking of the policy of decentralization, said that the corporation sought new fields where they could develop a better community life for workers. He believes that concentration of manufacturing activity in great urban centers is socially and economically undesirable. For one thing the cost of living is usually higher. When hard times come the smaller communities are better able to take care of themselves. He spoke for more and better jobs for more workers and more places. Other developments are being carried on in other parts of the country, as part of a $75,000,000 expansion program started in 1935. The corporation seems to be in a spending mood, as it climbs out of the depression at a very rapid rate. Certainly the facilities at Grand Rapids are the last word as far as buildings, equipment and working conditions are concerned.



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Belting Association Elects Officers

THE American Leather Belting Association has elected the following officers and members of the board of directors:

President, Mark M. Jones, Akron Belting Co., New York; first vice-president, J. Edgar Rhoads, J. E. Rhoads & Sons, Wilmington, Del.; second vice-president, Ernest D. Key, Atlanta Belting Co., Atlanta, Ga.; treasurer, Arthur H. Rahmann, Geo. Rahmann & Co., New York; secretary, J. Louis Nelson, New York.

Board of Directors: Three-year term—Edward H. Ball, Chicago Belting Co., Chicago; Aaron E. Carpenter, E. F. Houghton & Co., Philadelphia; G. Arthur Schieren, Charles A. Schieren Co., New York. Two-year term—J. Edgar Rhoads, J. E. Rhoads & Sons, Wilmington, Del.; Mark M. Jones, Akron Belting Co., New York; William T. Bell, Page Belting Co., Concord, N. H. One-year term—Ernest D. Key, Atlanta Belting Co., Atlanta, Ga.; C. L. Tolles, Hartford Belting Co., Hartford, Conn.; R. M. Pindell, Jr., Alexander Brothers, Inc., Philadelphia.

Eleven Aluminum Tanks Bought By Brewery

ALUMINUM CO. OF AMERICA has received an order for 11 400-bbl. aluminum storage tanks from the Victor Brewing Co., Jeannette, Pa. With the completion of this order, the number of aluminum tanks in this brewery will total 44. Victor's equipment already includes two 430-bbl. starting tanks, six 468-bbl. ale fermenters, 17 300-bbl. storage tanks and eight 204-bbl. Government tanks.

The Victor Brewing Co. has the largest aluminum brewery installation in the United States, while the next largest is that of the Hoffman Beverage Co., Newark, N. J.

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Today there are over four and three quarter million molded hand sets in use. The public finds them pleasant to handle, likes their modern design.

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We manufacture a wide variety of Durez molding compounds for hundreds of different uses. They are strong, light in weight, unaffected by water, heat, chemicals. Almost unlimited design possibilities and available in color. For more complete details, write to General Plastics, Inc., 112 Walck Road, North Tonawanda, New York.

GENERAL PLASTICS

DUREZ

WASHINGTON. . . . . .

. . . National Labor Relations Board issues complaint against Carnegie-Illinois Steel Corp. at behest of CIO

° ° °

. . . Steel companies find it difficult to quote on Government contracts under Walsh-Healey Act.

° ° °

. . . Social Security Program will cost steel industry and employee group each approximately $8,600,000 in 1937.

° ° °

By L. W. MOFFETT
Resident Washington Editor, The Iron Age

° ° °

WASHINGTON, Dec. 8.—The Committee for Industrial Organization, headed by John L. Lewis, has succeeded in having the National Labor Relations Board issue the first complaint in connection with the CIO's efforts to unionize the steel industry.

The complaint, announced yesterday, is directed against the United States Steel Corp., and the Carnegie-Illinois Steel Corp., and charges that they have interfered with the self-organization of their employees in 21 plants of Carnegie-Illinois. Hearing to "examine the facts" will be held in the Government auditorium in Washington, Dec. 17. The complaint is the outgrowth of charges by the CIO's Steel Workers' Organizing Committee and the Amalgamated Association of Iron, Steel and Tin Workers, and is considered to be tantamount to recognition by the NLRB of the CIO's affiliates as collective bargaining units in the steel industry. The complaint followed an investigation by the board's Pittsburgh regional office.

The board alleges that the Carnegie-Illinois company had insisted that representatives of the plan of employee representation approve a wage agreement, which it is stated was prepared by the company, without submission of its terms to the employees affected. The complaint charges domination and financial support of the plan, "established among employees of the United States Steel Corp. and its various subsidiaries." The National Labor Act prohibits financial support by a corporation of labor organizations.

The NLRB says that early in November a Pittsburgh District General Council was created, its delegates consisting of two employee representatives and two management representatives from each of the company's plants in the Pittsburgh district, and that the company has paid the expenses of the General Council's meetings. It is declared that no provision was made for collective meetings in the various plants to instruct delegates. After the General Council was created, it is stated, to handle matters affecting more than a single plant, a wage proposal was submitted to the employee representatives at the separate plants in identical form.

It is alleged that the company refused to negotiate concerning this agreement with the employee group of the General Council and also that it tried to remove the employee chairman on the ground that his representation of the employees was not within prescribed limits of the plan. The latter move, the board said, involved a secret meeting of delegates called without notifying the employee chairman.

Stating that the United States Steel Corp. established the employee representation plan in 1933, the complaint charges that in the course of putting the plan into operation the company dominated the employees and interfered with their rights to organize unhampered by management.

So-called defects in the plan as an instrument to provide expression of employee opinion are listed. It is stated that no provision appears in it for collective meetings and that there is no opportunity for employees to cast votes on important problems, such as wage agreements or the submission of disputes to arbitration. All expenses of the plan, it is declared, are borne by the company and newly hired employees are said automatically to become members of the plan. The company, the complaint states, does not advise them of the existence of the plans of the Amalgamated Association of Iron, Steel and Tin Workers. The latter now is an affiliate of the CIO.

The complaint says that employees' representative elections under the plan are held on company property and that the company permits incumbent employee representatives to campaign for reelection during working hours and at comany expense. Employee representatives, it is stated, act as tellers and compile votes in the elections, and are paid while so doing. The complaint states that foremen and superintendents, "having fire-and-hire powers, openly ascertain the names of employees who have failed to vote in a plan election." It is also stated that the bulletin boards are used to influence employees regarding wage proposals and that the minutes of employee representative meetings "are edited so that the full pro-

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ceedings are not known to the general run of employees."

For the purpose of justifying its jurisdiction, the board describes activities of the United States Steel Corp., as being on an interstate character and says that the Carnegie-Illinois Steel Corp., "treats its employer-employee relationship as interstate in character by the administration of the Pittsburgh District general council, which has employee delegates from the states of Pennsylvania and Ohio."

Social Security Program Adds Heavily To Steel Industry's Burden of Taxation

WASHINGTON, Dec. 8.—Calculated on the basis of present payrolls, the iron and steel industry will be required in 1937 to contribute approximately $17,200,000 to the old age pension fund under the Social Security Act, taxes for which become effective Jan. 1. Half of the taxes will come from each—the employees and the employers in the industry. Deductions from the earnings of employees will be 1 per cent of their monthly earnings in 1937, 1938, and 1939. The estimated contribution for next year is based on total payrolls of the industry, which, according to the American Iron and Steel Institute, are now at the annual rate of $860,000,000. On a like payroll after 1948 collections from the steel industry would be $51,600,000 since the tax rate will be 3 per cent.

The present payroll is the highest in any peace-time year, except 1929, when the total was $914,000,000, according to the institute. Employment is at a record peak, aggregating 526,000, of whom 476,000 are wage earners and 50,000 are white collar employees. With recent increases in wages averaging close to 10 per cent, the average rate of pay is 73c. per hr., the highest in the history of the industry.

Barring labor troubles and other possible difficulties, activity in the iron and steel industry will expand further next year. In such an event manifestly the old age pension contributions will be greater than the foregoing estimate, which is based on the prevailing payroll rate. Deductions will apply up to but not beyond yearly income of $3,000.

The tax rates are also built on an ascending scale. In 1940, 1941 and 1942, deductions from payrolls will be 1½ per cent per month. In 1943, 1944 and 1945, they will be 2 per cent. In 1946, 1947 and 1948, they will be 2½ per cent. In 1948 and thereafter they will be 3 per cent. At all times sums deducted from payrolls are to be matched by employers, the money to be paid to the United States Treasury. The Secretary of the Treasury will place the collections in the "Old Age Reserve Account." Beginning Jan. 1, 1942, payments from this fund will be made to those qualified for old-age benefits. To qualify for old-age benefits it is necessary to be 65 years of age, to receive not less than $2,000 in total wages paid in each of the five years after Dec. 31, 1936, before reaching the age of 65. Wages must not be received for employment in any month in which benefits are payable.

The minimum monthly benefit is $10, based on total wages of $2,000. The maximum monthly benefit is

New 1937 Lathes

THE new 1937 Series of Back-Geared, Screw Cutting South Bend Precision Lathes with Double Wall Aprons and hardened and ground headstock spindles are recommended for the finest and most accurate work in the tool room, machine shop, manufacturing plant, and laboratory. These new lathes are offered in sizes 9" to 16" swing, in bed lengths from 3' to 14', Motor Drive and Countershaft Drive.

Catalog No. 96 shows the new Series "R" South Bend Precision Lathes in all sizes and styles. A valuable book for the shop man, engineer, and plant executive. Sent free, postpaid, upon request. A post card will bring it.

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$85, based on total wages of $129,000. The minimum total payment is $70. The maximum total payment is $4,515. Both the monthly benefits and the total payments are calculated on a rate of 3½ per cent of total wages. Assuming a steelworker earns $1,650 a year for 20 years, his total wages would be $33,000, entitling him to a monthly retirement benefit of $40, or a total payment of $1,155. Cash values at all times, according to the Social Security Board, will be substantially larger than the worker's own contributions. If total monthly benefits paid prior to the death of the payee do not equal the minimum total payments due him, the difference between the benefit already paid and the amount of the total due under the act is payable as a death benefit.

The act does not apply to agricultural workers, domestic service in private homes, in Government service and in a few other excluded occupations. The Government has had for a number of years a pension plan in operation. It provides for contributions of 3 per cent of salaries, and retirement at the age of 70 with a maximum monthly benefit of $100. The Social Security Board is considering a voluntary old-age insurance program for 16,000,000 agricultural and domestic workers. It would also be made available to the same 26,000,000 workers affected by the Social Security Act.

Last Saturday was the deadline for all eligible workers under the Social Security Act to return applications, but an extension to Dec. 15 has been announced. Listing of the employees in the Federal records began at Baltimore Dec. 2 and thus started the most vast filing system in the country.

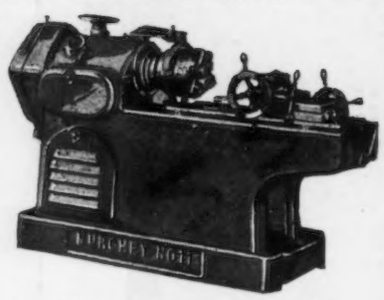
The Post Office Department has issued instructions to postmasters throughout the country to submit the names of all employers who have not returned applications for identification numbers. The department stated that as soon as each postmaster completes a thorough canvass of such employers, a list will be submitted to the Social Security Board. The "Employer's Application for Identification Number" form asks the employer for information designed to assist the Post Office Department to know how many employee application forms to deliver to each employer.

Cost to Steel Industry

Assuming steel makers are required in 1937 to contribute $8,600,000 under the Social Security Act, this will mean an additional tax on the industry—which is not meant as a criticism of the purposes of the act itself. This added tax, if based on the probable 1936 rolled steel production, which may be approximated at 36,000,000 tons, would be 24c. per ton. Already the industry pays local, State and Federal taxes of at least $3.50 per ton —undoubtedly an underestimate. This totals 127,000,000 on the basis of a 36,000,000-ton output—which, barring interruptions, will be exceeded in 1937. Earnings of the steel industry, it is estimated by the institute will be $150,000,000 in in 1936, or only $23,000,00 in excess of the estimated taxes—probably the underestimated taxes. Adding about $8,600,000 in taxes the earnings would exceed taxes by only $14,400,000. And the Social Security taxes are on a rising scale.

Rising taxes mean rising costs. Rising costs mean rising prices. And prices generally have risen

MODERNIZATION in THREADING



The No. 11 Machine, cutting machine threads 1/4 to 1 1/2" and from 1/4 to 1" pipe, comes in the Single and Double Head types.

The No. 22, a larger machine, cutting machine threads 1/2 to 2 1/2" and from 1/2 to 2" pipe, also is built in the Single and Double Head types.

Machines may be equipped to use Circular or Tangential type chasers.

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1. Pre-loaded roller bearings throughout.
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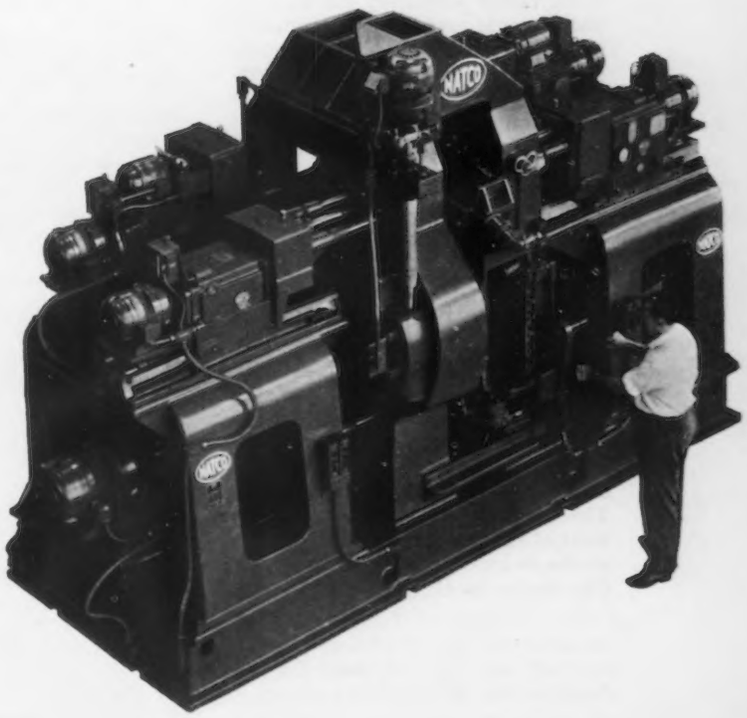
• Equipped with a semi-automatic hydraulic feed, these NATCO HOLEUNITS will operate at any angle. They may be arranged in groups to perform all the required operations on a casting with a single handling. Should the part for which the units are arranged be altered or discontinued, it is only necessary to rearrange the units, equip them with new spindle boxes and the machine may be used for an entirely different piece of work.

• Illustrated at the right is a NATCO two-way six-headed machine . . . distinctly a single purpose machine built to perform a total of twenty-one drilling, core drilling, chamfering, counterboring, spot facing, reaming, and tapping operations on the oil pump pad and distributor shaft pad of a medium size cast iron cylinder block . . . yet the machine is built of standard NATCO HOLEUNITS . . . and may be altered as required with a minimum of expense.

• NATCO HOLEUNITS are built in a variety of sizes and capacities. Call, wire or write for a NATCO representative. Investigate NATCO HOLEUNITS today.



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and are still rising to a point where they are known to be a source of concern to administration sources. Manifestly the rise in the cost of living reduces purchasing power and deprives workers of full benefit of wage increases. Hence the Government itself, instead of calling upon industry constantly to cooperate toward greater employment and recovery, might well institute economies at once rather than simply talk about them. Lowering taxes—certainly not in prospect—would mean more to industry in the way of employment, keeping down costs and prices, without reducing wages, and expanding markets than will any plan of further regimentation of which so much is again being heard.

To Open Bids for Steel for Navy

WASHINGTON, Dec. 8.—The Bureau of Supplies and Accounts will open bids on Dec. 18 for 4383 tons of plates and sheets for six destroyers and for 715 tons of shapes for Navy yard stock. Three of the destroyers will be built at the Norfolk, Va., yard, two at the Boston yard and one at the Charleston, S. C., yard.

The Bureau of Supplies, Navy Department, will open bids Dec. 18 for 245 tons of rivet steel for delivery to the various Navy yards.

Spanish Moroccan Ore Accumulates

WASHINGTON, Dec. 8.—As a result of the interruption of exports of iron ore from Spanish Morocco large stocks of ore have accumulated in that area, according to a report from Consul H. A. Doolittle, Tangier, made public by the Commerce Department.

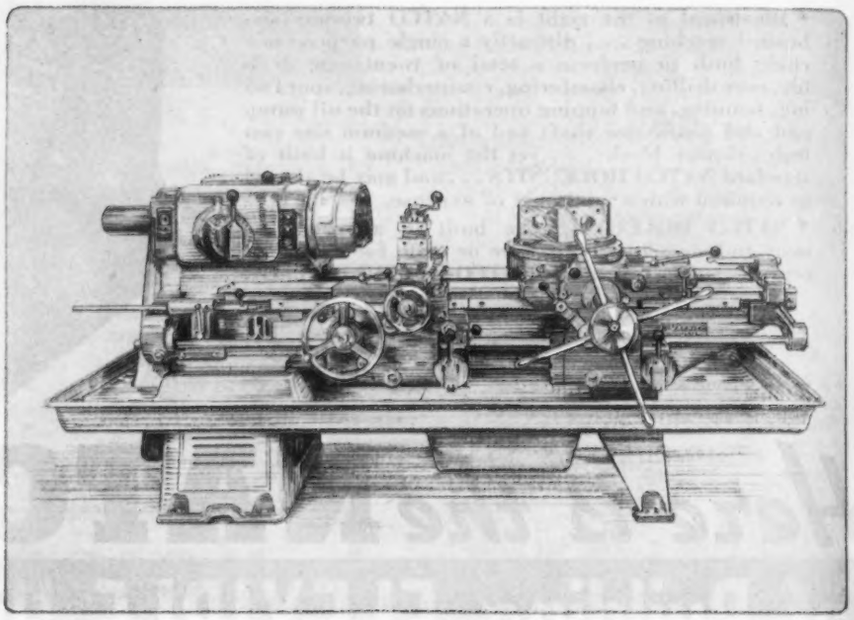
There is only one producing company in the country at the present time and it is controlled entirely by Spanish capital and operates under the direction of an American engineer. Its daily production is estimated at approximately 2000 metric tons. Iron ore accumulated in the ore bins of the mines and the loading tips at Melilla aggregate some 300,000 tons. Practically all the iron ore mined in Spanish Morocco, the report points out, is shipped outside the country, at least 90 per cent being sold in various European countries with England and Germany the chief purchasers. Since the present conflict started only 70,000 tons have been exported to Germany, it was stated.

Since the beginning of the exploitation of the Spanish Moroccan mines, a few shipments of iron ore have been made to the United States but the difficulty in obtaining bottoms for this traffic has hampered any development of the trade. There are more reserves in Spanish Morocco estimated at 25,000,000 tons still untouched.

Social Security Board Table Showing Monthly Pension Payments

Average Monthly Salary	Years of Work								
	5	10	15	20	25	30	35	40	45
$25	*	$15.00	$16.25	$17.50	$18.75	$20.00	$21.35	$22.50	$23.75
50	$15.00	17.50	20.00	22.50	25.00	27.50	30.00	32.50	35.00
75	16.25	20.00	23.75	27.50	31.25	35.00	38.75	42.50	46.25
100	17.50	22.50	27.50	32.50	37.50	42.50	47.50	51.25	53.75
125	18.75	25.00	31.25	37.50	43.75	50.00	53.13	56.25	59.39
150	20.00	27.50	35.00	42.50	50.00	53.75	57.75	61.25	65.00
175	21.25	30.00	38.75	47.50	53.13	57.50	61.88	66.25	70.63
200	22.50	32.50	42.50	51.25	56.25	61.25	66.25	71.25	76.23
225	23.75	35.00	46.25	53.75	59.38	65.00	70.63	76.25	81.88
250	25.00	37.50	50.00	56.25	62.50	68.75	75.00	81.25	85.00

*Lump payment of $52.50, based on 3½ per cent of total income of $1,500.



WE DREW FROM PAST

The Jones & Lamson Machine Company, having built turret lathes for 87 years, drew from its past experience when designing the new line of Saddle Type and Ram Type machines. Not only has experience gone into these new lathes, but also the very latest in design and materials. They are modern machines for modern needs.

JONES & LAMSON MACHINE COM

Steel Companies Take "Exceptions" In Bidding Under Walsh-Healy Act

WASHINGTON, Dec. 8—The Walsh - Healey Government Contracts Act proved a stumbling block to the submission of satisfactory bids by steel manufacturers last Friday in connection with a Navy Department opening covering 4030 tons of plates, sheets, strips and shapes for three submarines. The only bid for all of the steel was offered by Carroll & McCreary, Brooklyn jobbers. The Lukens Steel Co., Coatesville, Pa., bid on approximately 2500 tons of the material but noted exceptions, which apparently would conflict with provisions of the Walsh-Healey act. The other bidders were the Carnegie-Illinois Steel Corp., and the Phoenix Iron Co. Each of the two producers bid on quantities involving less than $10,000. Under the act its provisions do not apply to bids involving $10,000 and less.

The act requires a contractor to adhere to maximum hours not exceeding 8-hr. per day, and 40-hr. per week, with minimum wages, and payment of time and one-half for overtime. The Lukens Steel Co. exceptions provided that fulfillment of the contract must be based on prevailing wages as paid by the company at the time of the award and during the life of the contract and on the hourly working schedule of the company during the life of the contract. The company also noted disagreement with provisions of the act concerning liability for violation and said it could not meet the provisions relating to posting of stipulations. Concerning the provision as to rate of pay, the Lukens company said it would pay the prevailing wage of the company applying at the time of the award and during the life of the contract. It also required deletion of instructions as to available records to be kept by the employer.

The bids reflected the first conflict between the steel industry and the Walsh-Healy act. The difficulty appears to be the onerous provisions of the law, such as requirement for time and one-half for overtime and the keeping of voluminous records. The wages and average hours of the industry are in themselves within the requirements of the act. The industry is on an 8-hr. day basis and its average work week is only 40.2 hr. The difficulty, common to continuous process industries, is that there is no way absolutely to control rolling schedules. Obviously once started they must be completed, with the result that frequently it is not possible to limit the hours with exactitude.

The Navy Department has not made known what it will do with respect to these and possibly future bids on steel. Up to the present the Walsh-Healey Board has indicated that it will not waive provisions of the act. Recently the Procurement Division of the Treasury threw out so-called "split" bids for motor trucks and readvertised. In consequence it paid more for the trucks than it would have had to pay had it accepted the "split" bids. The latter involved contracts involving $10,000 or less. The Procurement Division served notice that bids must be based on an "all or none basis."

The steel bids were for material for two submarines to be built at the Portsmouth, N. H., Navy Yard and one to be built at the Mare Island, Cal., yard. Most of the tonnage was plates, with 300 tons being shapes.

Esco Engineering Service Co., maker of the Esco drill jig, has moved to larger quarters at 3120 Monroe Street, Toledo, Ohio. Additional machinery is being installed to increase their capacity for General tool work and the production of the Esco drill jig.

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OM PANY, Springfield, Vermont, U. S. A.

Alluminum Alloy Rivets Tested

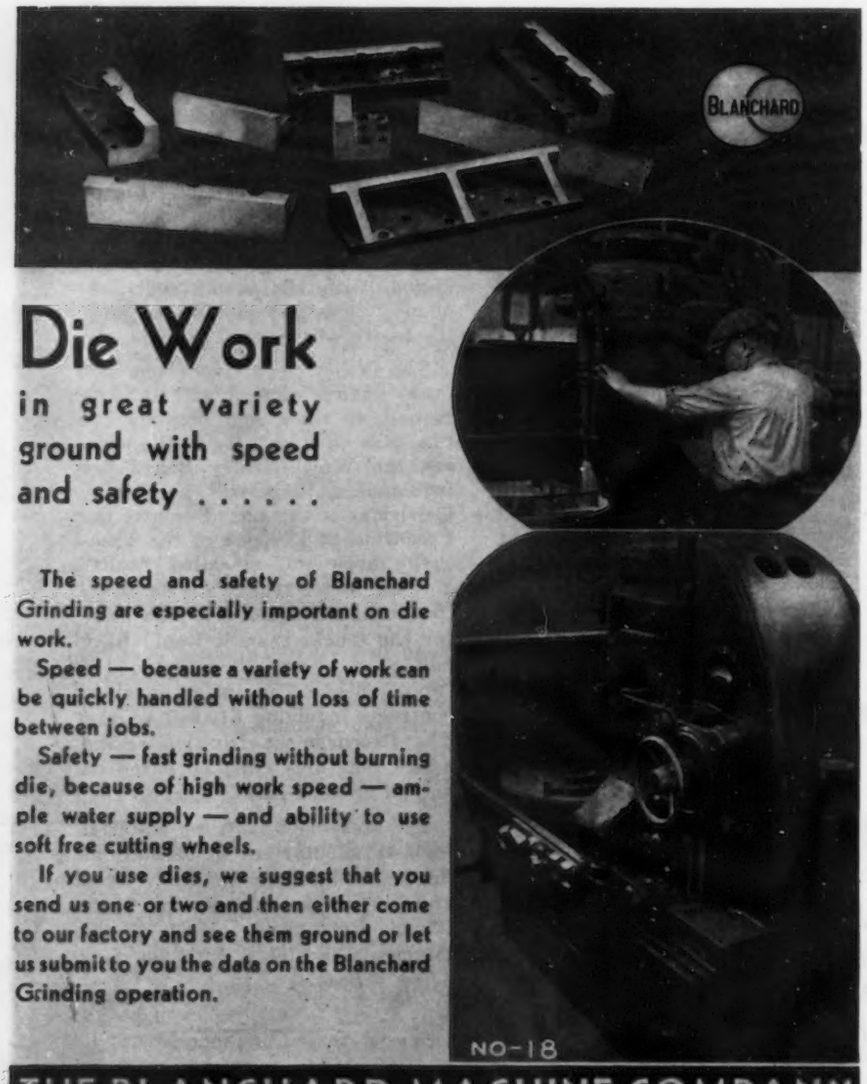
WASHINGTON, Dec. 8.—The extensive use in aircraft construction of aluminum alloy structural members joined by riveting has created a need for detailed information regarding the strength of such joints.

As the beginning of an investigation to provide this information, auxiliary tests have been made by W. C. Brueggeman of the National Bureau of Standards, with the assistance of the National Advisory Committee for Aeronautics to determine how the strength of a riveted joint is influenced by the form of the rivet head, the driving stress, the ratio of rivet diameter to sheet thickness, and other factors, the Department of Commerce has announced.

When driving several standard types of head by the "squeeze" method Mr. Brueggeman found that buckling of the sheets occurred before the driven head was completed, an exception being the cone-point head. However, test results indicated that a complete head is not essential to develop the maximum shearing and tensile strength of the rivet. The relation between the driving stress and the head dimensions was determined, according to the Commerce Department.

Mr. Brueggeman stated that it has been found impracticable to use the radial deformation in the sheets as a criterion of buckling.

The shank of a rivet is upset, i. e., increased in diameter, by driving. The amount of upsetting depends chiefly on the ratio of the rivet diameter to sheet thickness. Tests of rivet wire indicated that upsetting decreases the shearing strength, tensile strength, and elongation. The shearing strength obtained agreed closely with the results of shearing tests of actual joints, it was stated.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British Steel Output At a New High

WASHINGTON, Dec. 8.—A new all-time monthly record for steel ingot production was established in Great Britain during October when the total reached 1,060,500 tons, according to a report to the Commerce Department from Assistant Commercial Attache Homer S. Fox, London. The October production, it is pointed out, was slightly in excess of the September figure, the previous record. British production of pig iron in October amounted to 670,300 tons against 650,800 tons in September. At the end of October, the British iron and steel industry had 113 furnaces in blast, a net increase of two during the month.

The British iron and steel industry, it is pointed out, is somewhat concerned over the possible shortage of iron ore supplies arising out of the conditions in Spain. As a result, more attention has been given to the question of obtaining ore supplies from other sources, particularly Empire sources Newfoundland, Sierra Leone and Rhodesia, among British countries, and Brazil among foreign countries, are under consideration as possible sources for increased supplies of iron ore.

Birmingham Company Gets Large Contract

WASHINGTON, Dec. 8.—Award of the contract for the manufacture and delivery of 20 sets of gates for the first tier of outlet works in Grand Coulee dam to the Hardie-Tynes Mfg. Co., Birmingham, at $1,454,141.21 has been announced by Secretary of the Interior Ickes. Each set of gates consists of one ring-follower gate 102-in. in diameter, with hoist and appurtenances; one paradox gate, 102-in. in diameter, with hoist, motor, hoist switch and other appurtenances, and sections of steel lining for the outlet conduit. The 20 sets make up the biggest job of this type placed under contract by the Government to date.

$5,781,235 Dam Job Awarded

WASHINGTON, Dec. 8.—Secretary of Interior Ickes has awarded a contract for construction of Marshall Ford dam on the Colorado River of Texas to Brown & Root, Inc., Austin, Tex., and McKenzie Construction Co., San Antonio, Tex., on their joint bid of $5,781,235. No power plant will be constructed at this time, although the penstocks will be included in the low dam, about 18 miles above Austin. This dam will be 190-ft. high. The other dam, known as the ultimate dam, will be 265-ft. high and the former is to be built first. It will be a concrete dam of the straight-gravity type.

Basing Point Bill Not Decided Upon

WASHINGTON, Dec. 8.—Senator Wheeler of Montana, chairman of the Committee on Interstate Commerce, yesterday told THE IRON AGE that he cannot say at this time whether or not he will re-introduce the Wheeler-Utterback basing point bill. Reports have been published that the Senator would again introduce the bill and begin hearings following hearings his committee begun yesterday on railroad refinancing. Indications are that the latter will be prolonged.

Duty on Bale Ties Of 45% Affirmed

WASHINGTON, Dec. 8.—The United States Court of Customs and Patent Appeals has affirmed the judgment of the United States Customs Court that bale ties should be assessed at 45 per cent duty as manufacturers of metal. M. Martinez & Co., importer, had protested that they were properly dutiable at ½c. per lb. as wire commonly used for baling hay.

100-Ton Airplanes Predicted in 5 Years

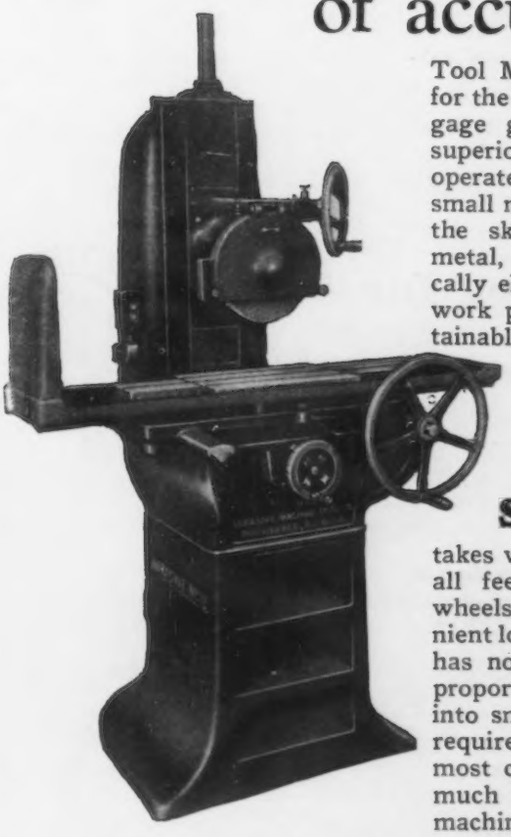
AT a round-table discussion on "The Next Five Years in Aviation" last week eight leaders in various fields of aeronautics predicted the flying of all major oceans on regular schedule in planes of 50 to 100 tons weight, with such smoothness that even a glass of water would not be spilled in rough air; sufficient development in fuels that the 100-octane fuel now used for military and racing purposes would be available for ordinary commercial use; the dominance of spark-ignition engines over the diesel for aircraft use because of advances in design and economies of fuel consumption; and the regular practice of airplanes hooking onto and taking off from airships in flight.

Those taking part in the meeting were: Prof. Jerome C. Hunsaker, head of the Department of Mechanical and Aeronautical Engineering, Massachusetts Institute of Technology; C. F. Taylor, professor aeronautical engineering, M.I.T.; Dr. Graham Edgar, director of research, Ethyl Gasoline Corp.; Igor I. Sikorsky, vice-president, Sikorsky Aircraft Corp.; B. C. Boulton, engineer, Glenn L. Martin Co.; and Commander Charles E. Rosendahl, commandant Naval Air Station, Lakehurst, N. J.

Following the discussion films of the new aeronautical research laboratories in Great Britain, Germany, France and Italy were shown for the first time in this country, and explained by representatives from the various nations.

A new plant, which is to be the largest single unit in the company, and is for the purpose of handling Eastern business, is being constructed in Trenton, N. J., by the L. A. Young Spring & Wire Corp., Detroit.

Gives a beautiful finish— to the highest degree of accuracy



Tool Makers who are responsible for the finer types of flat, form, and gage grinding will welcome the superior qualities of this hand-operated machine. Because of the small number of moving parts and the skillful proportioning of its metal, vibration has been practically eliminated and the quality of work produced is the highest obtainable.

The New ABRASIVE No. 1½ Surface Grinder

takes work up to 15"x10"x12", and all feeds are operated by hand wheels of ample size and convenient location. Careful investigation has not only proved that a large proportion of toolroom jobs going into small surface grinders do not require automatic feeds, but that in most cases the work can be done much faster with this hand feed machine.

ABRASIVE MACHINE TOOL CO.

E. Providence, R. I.

E. T. Weir Asks Industry to Unite to Improve Status of Low-Income Groups

SPEAKING on the general subject of "Industry Must Speak Constructively," E. T. Weir, chairman of the board, National Steel Corp., on Wednesday told assembled members and guests of the National Association of Manufacturers in New York that, even though the country is moving out of the depression, industry has yet fully to recognize its responsibility in solving some of the problems emphasized by the depression. These problems still exist, and, if ignored, they will rise again to afflict the country.

Mr. Weir stated that, "at this time, our opportunity is unique. The depression is passing, but it is painfully fresh in memory. And we have not yet come to the place where the healing of our wounds and the invigorating stimulus of better conditions can tempt us to brush aside larger considerations and bury ourselves within the limits of our private businesses.

". . . today new things are expected of industry and of industrial leadership. Industry is expected to broaden its activity beyond the making and selling of goods. The industrial leader is expected to accept his responsibility not only to be an efficient producer and seller, but also to recognize the influence of his economic actions in social and political fields. Industrial leadership is expected not only to guide industry as the instrument for the making of all the material things that people need, but in addition, to use industry as an instrument that will aid in solving the human problems of poverty, unemployment and others accentuated by the depression.

". . . this seems to be the essence of the popular feeling today. It explains popular support of certain legislation which politicians have enacted and attempted to enact. It explains a frequently heard but inaccurate statement that the American people now distrust industry. The American people are sold a thousand per cent on *industry*. They know that industry provides both goods and employment. But I believe there is a disappointment with *management*. Our American way of life rests on an economic foundation. Throughout our history our real leaders have been economic leaders. The people have instinctively looked to those leaders —or management—to provide them with the opportunity to work, to acquire goods and savings, and to be secure in them.

Many Are Hard Pressed

". . . the Brookings Institution study showed that in 1929 more than 42 per cent of American families received less than $1,500 and almost 60 per cent received less than $2,000 annually. Such incomes are little above the subsistence line. They do not permit those receiving them to share to any great extent in the use of the goods they help

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Exclusive MARVEL High-Speed-Edge BLADES
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High Speed Steel for cutting; tough Alloy Steel to take the strain and shock. Only MARVEL High-Speed-Edge Blades combine these features . . . can give the fast-cutting, long-lasting qualities of genuine 18% Tungsten High Speed Steel and at the same time be POSITIVELY UNBREAKABLE, shatter proof, safe. For uninterrupted, scheduled production; for a full profit on each job . . . for absolute dependability and low blade cost, use MARVEL High-Speed-Edge BLADES for all metal sawing.
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AUTOMATIC CLAMPING
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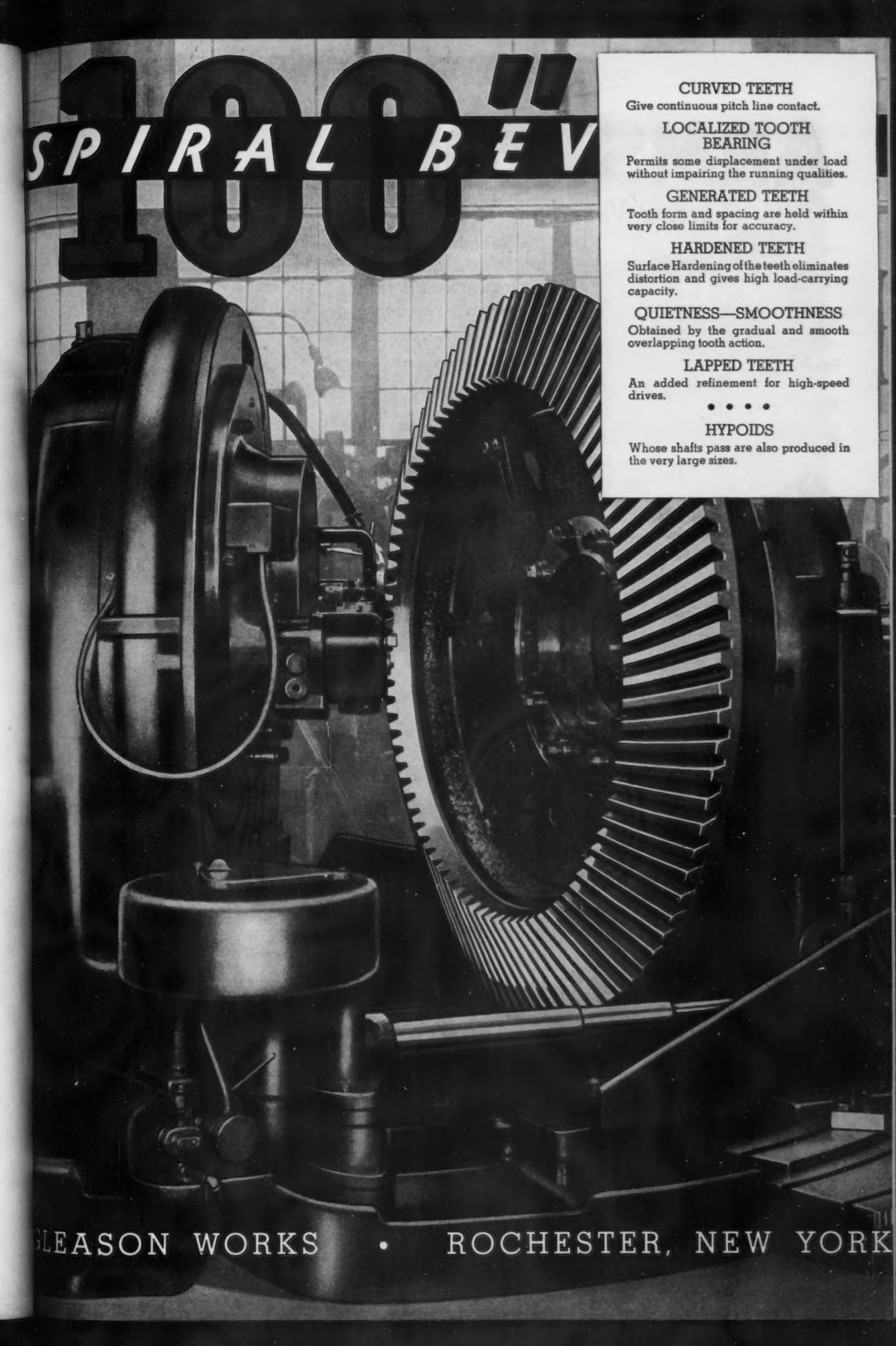
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SPIRAL BEV
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Give continuous pitch line contact.
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Permits some displacement under load without impairing the running qualities.
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Tooth form and spacing are held within very close limits for accuracy.
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Surface Hardening of the teeth eliminates distortion and gives high load-carrying capacity.
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In assembly work where light weight increases speed—on automatic machinery where nuts are thin and wrench heads should be—around machinery where longer wrenches are needed and for overhead maintenance work where light weight, added reach and extra strength add to safety, specify ARMSTRONG Chrome-Vanadium WRENCHES.

Longer, lighter, thinner, stronger, chrome-plated with heads ground bright. ARMSTRONG Chrome-Vanadium Wrenches make work faster, easier, safer.

Write for Catalog W-35

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
309 N. FRANCISCO AVE. CHICAGO, U. S. A.

to produce. Even the most thrifty are hard-pressed to save enough to long withstand unemployment or partial employment. It is little wonder that, under the pressure of the depression, an almost universal demand arose for greater income, more surety of regular income, and protection against future adversity.

". . . as a fundamental, it should be accepted that the primary function of industry must continue to be the increase of total wealth through increase in the volume and quality and decrease in the cost of goods. If all present wealth were divided equally among our population, the individual share would be relatively very small. All the goods which our present industrial capacity could possibly produce would be insufficient for the minimum needs of all of our people. Therefore, any attempt of industry to solve human problems must be supported by continuance of its traditional efforts to improve itself as a maker of goods.

". . . another objective should be control of the processes which increase real income. Of course, real income increases only as the volume of goods increases. But the volume of goods is regulated ultimately by the demand for them. Demand can be increased not alone by increase in total national income, but also by distribution of the increase through the whole population. Increases that are gained by certain groups at the expense of other groups, or at the expense of the entire population, add nothing to total buying power and aggravate economic troubles. Similarly, wage increases or investment returns that are paid solely through price increases are only apparent gains which add nothing to buying power and lead first to inflated values, then again to depression.

Better Public Relations Needed

". . . it is probable that work on this problem will indicate that special attention should be given the low-income groups. This would have human value because these groups are most in need. It would have economic value because any increase of income to these groups would be largely and quickly converted into increased demand for goods, increased production and increased total wealth. This last remark is no suggestion that income should be leveled. Our progress has been accomplished, and will be accomplished in the future, by the incentive of bigger rewards for better work. Whatever is done to improve basic conditions must include preservation of that incentive.

". . . hand in hand with the problem of increasing real income will go the problem of retaining the increase. The effect of even greatly increased income would be nullified if the income were to be stopped or reduced and the savings from it wiped out by the extremes of uncontrolled economic fluctuations. This problem, of course, is largely the problem of unemployment which must be a major objective in any program of industry.

". . . in addition to study of human problems and then action on them, a program by industry should include another objective, and that is improvement in its relations to the public. It should spare no effort to make it clearly understood that the aims of industry and the aims of the great body of people are mutual—not opposed. At present we have the

NOW! You Can Prevent PRESSURE EXPLOSIONS In Industry

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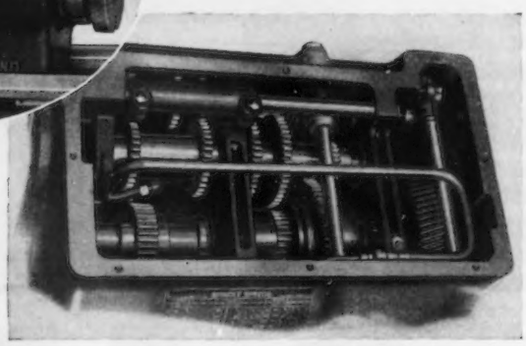
paradoxical situation of industry going to any lengths to give the public complete information about its products, while it makes little effort to give information concerning the policies and conditions surrounding the making of those products. Thus we have the equally paradoxical situation of the public accepting without question anything that a manufacturer says about his product, and doubting many of the things that he says about himself or his methods.

". . . but do any of you doubt that industry has the quality of leadership to accomplish these things? I, for one, have not the slightest doubt. In this room are leaders of industry who can accomplish any practicable undertaking. All that is needed is the understanding, the active participation, and the continuing interest of industrial executives who realize that these broader matters are a vital part of their job. The problems we have discussed are our common problems. Let us make common cause against them. In this great meeting, we have united to consider the interests and needs that are general to industry. Before we separate to return to individual businesses and individual problems, I earnestly recommend that, through this National Association of Manufacturers, we take the first definite steps toward a program that will unite us in constructive action on these great problems—and through this cooperation lead on toward their solution for the general good."

Assured Accuracy and Precision with LeBLOND Tool Room Lathes

In 12, 14, 16 and 18 inch sizes, the LeBlond Tool Room Lathe embodies in its construction and design many new, exclusive LeBlond features and improvements, resulting in sharply reduced costs in the manufacture of tools and fixtures. Tool makers appreciate the ease and speed of operation, the accuracy, precision, permanent alignment, long life and unmatched performance of these fine lathes . . . their adaptability for all kinds of tool room work.



Shown are four exclusive LeBlond Tool Room lathe features: The Simplified Feed Drive (compounding and reversing gears inside the head) New Taper Spindle Nose; Interior and exterior of the 12 Speed Headstock equipped with ground gears and antifriction bearings.

FREE LITERATURE: Write for copy of 101 Reasons illustrating the many advantages of these outstanding LeBlond Tool Room lathes

The R. K. LeBLOND MACHINE TOOL CO., CINCINNATI, O.
HALF CENTURY OF SERVICE TO INDUSTRY

. . CAST IRON PIPE . .

Lake Villa, Ill., plans pipe lines for water system; also other waterworks installation, including elevated steel tank and tower. Cost about $40,000, of which $18,000 is being secured through Federal grant. James Anderson Co., 290 East Deerpath Avenue, Lake Forest, Ill., is consulting engineer.

Rockland, Mass., has authorized pipe lines for extensions in water system, including elevated steel tank and tower, and other waterworks installation. Cost about $70,000. A. B. Reed, 89 Broad Street, Boston, is consulting engineer.

Englewood, Tenn., plans pipe lines for water system; also 100,000-gal. elevated steel tank and other waterworks installation. Fund of $63,636 has been secured through Federal grant and loan.

Galatia, Ill., closes bids Dec. 14 for pipe lines for water system and other waterworks installation. Kinsey Engineering Co., Pekin, Ill., is consulting engineer.

White City, Kan., plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Cost about $52,000. Special election has been called Dec. 14 to approve bonds for $28,000, remainder of fund to be secured through Federal aid. Paulette & Wilson, National Reserve Building, Topeka, Kan., and Farmers' Union Building, Salina, Kan., are consulting engineers.

Amity, Ark., plans pipe lines for water system; also other waterworks installation. Fund of $34,000 has been secured through Federal grant and loan.

Sunset, La., closes bids Dec. 15 for pipe for water system, elevated steel tank and tower, pumping machinery and accessories, and other waterworks installation. J. B. McCrary Co., Marietta Street Building, Atlanta, Ga., is consulting engineer.

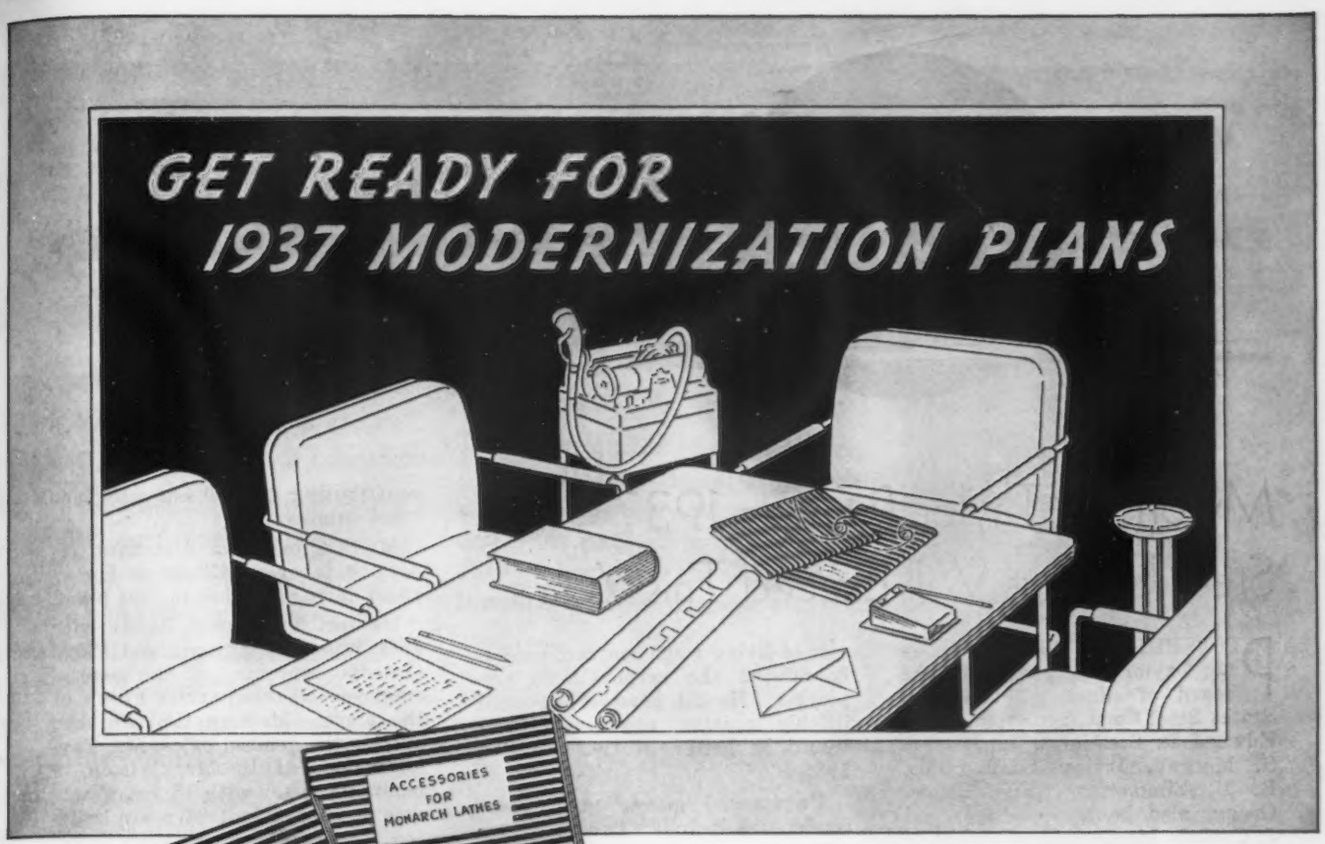
Metropolitan Water District, 306 West Third Street, Los Angeles, closes bids Dec. 14 for pipe for water lines for fire protection system at Gene and Hayfield pumping stations on Aqueduct water system, as follows: Gene station, 152,600 lb. of 3, 4, 6 and 8-in.; also 1200 ft. of 1-in. galvanized steel pipe (Schedule 1); Hayfield station, 50,000 lb. of 3, 4 and 6-in.; also water tank, valves, fittings, etc. (Schedule 2). (Specifications 179.) F. E. Weymouth is chief engineer.

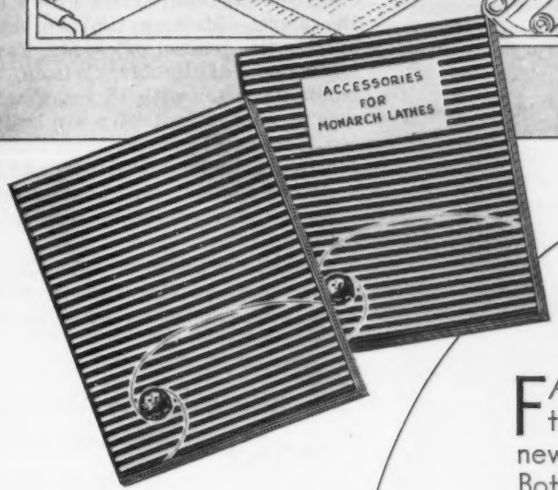
Twin Falls, Idaho, plans pipe lines for water system, replacing existing old pipe between municipal filtration plant and city station; also new 10,000,000-gal. storage reservoir. Special election has been called Dec. 15 to approve bonds for $200,000, of which about $112,000 will be used for pipe lines.

Cumberland, Md., asks bids until Dec. 12 for pipe for water system in Braddock Road, including two pumping units and accessory equipment (Contract A); elevated steel tank and tower (Contract B). Ralph L. Rizer is city engineer.

East Prairie, Mo., plans pipe lines for water system and other waterworks installation. Fund of $36,363 has been secured through Federal aid.

GET READY FOR 1937 MODERNIZATION PLANS





JUST OFF THE PRESS

Here they are—those two indispensable Monarch catalogs for 1937! The one on the left is the 40-page Monarch Feature Catalog, that pictures and describes the complete line of Monarch lathes. On the right is the Monarch Accessory Catalog, its 40 pages replete with photographs and facts of Monarch accessories. Both catalogs will be sent immediately upon request...and without obligation.

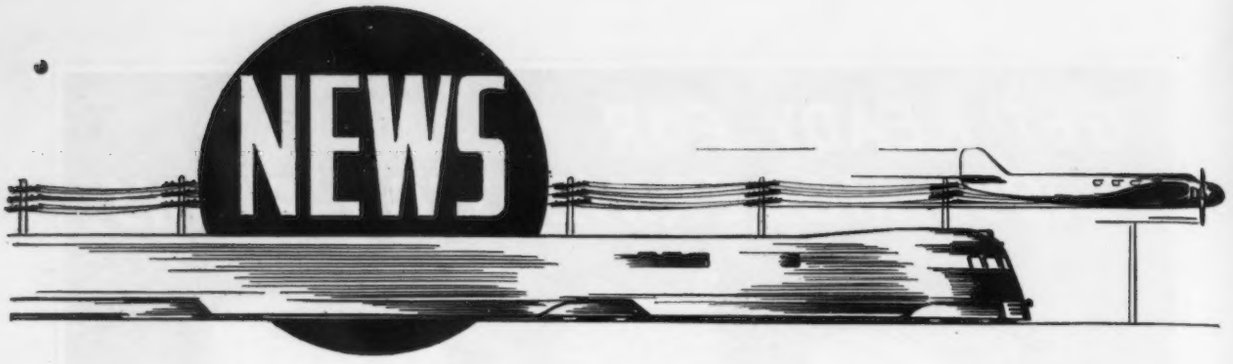
FACTS of vital importance to all production executives are contained in the two new 40-page Monarch catalogs for 1937. Both deserve a place on any conference table around which production plans for the coming year will be discussed.

Entirely new and completely different, these catalogs point the way to greater efficiency, faster production, maximum economy and larger profits. Sound business judgment urges their careful consideration.

Copies are now available for the use of your executives and for your permanent office files. Kindly specify the names of individuals for whom extra copies are desired. The Monarch Machine Tool Co., Sidney, Ohio, U. S. A.

MONARCH LATHES
COVER THE TURNING FIELD

New York Sales Offices: 413 Graybar Building
Chicago Sales Office: 622 W. Washington Blvd.



Myron C. Taylor Predicts 1937 Steel Output Will Exceed This Year's

PITTSBURGH, Dec. 8.—Myron C. Taylor, chairman of the board of directors, United States Steel Corp., accompanied by Edward R. Stettinius, Jr., Junius S. Morgan, Irving Sands Olds, R. E. Zimmerman, and Robert Gregg, also board members, and J. Carlisle MacDonald, assistant to Mr. Taylor, paid a visit to Pittsburgh last week. While in the city, the party inspected the new 100-in. plate mill at Homestead, Pa., which is expected to go into operation within the next few weeks. An inspection visit was made to the new coal research laboratory at Carnegie Institute of Technology in which Mr. Taylor has been intensely interested, having given his support since the inception of the project.

At a meeting late in the afternoon with a score of newspaper men, Mr. Taylor declined to discuss questions concerning the possibility of refinancing by the United States Steel Corp. and the cost-of-living wage contract recently offered the corporation's employees. He did, however, say that in his opinion steel operations would be better in 1937 than in 1936.

Unexpected "guests" at the press conference included two representatives from the Steel Workers' Organizing Committee who insisted they were eligible to attend a newspaper gathering as they represented a labor paper published by the SWOC.

Later in the evening Mr. Taylor attended a banquet where he and other outstanding business leaders and scientists heard the story of Carnegie Institute of Technology's coal research laboratory, told by Dr. Thomas S. Baker, president emeritus of Carnegie Institute of Technology.

Work of the laboratory, discovery of new coal uses, is supported financially by the Buhl foundation, by Mr. Taylor whose company is contributing $90,000 annually, and other interests.

Mr. Taylor got a first hand report on labor conditions at Homestead during his visit to that plant.

He met and shook hands with Jack Wilson, chairman, and Floyd Colledge, secretary, of the general employee representatives group at the plant. Meeting the two men outside the general office, Mr. Taylor remarked to Mr. Wilson, a motor inspector with 15 years' service at Homestead: "We are building a new mill for you down here." Mr. Wilson replied: "Homestead is a satisfied plant, Mr. Taylor, and I hope the corporation will take notice of it."

Mr. Taylor urged Mr. Wilson to call on him at his office in New York whenever he happens to be there.

158 Ships Under Contract

ON Nov. 1, American shipyards were building or under contract to build for private shipowners 157 vessels, aggregating 201,106 gross tons, of which 148 were steel vessels of 198,126 tons.

NEWS AND MARKET INDEX

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Plan with *Elwell-Parker* for your Biggest Load-Handling Year

PROFITS from next year's new high volume of orders are expected to top the records of a decade.

Executives who have recently equipped with automatic, high-speed machinery will turn out all the finished parts they need during even a peak year. But parts *must travel*—and unless load-handling is modernized along with other production equipment, there is danger of losing as much in transportation alone as has been saved elsewhere throughout the plant—or even more.

Why don't *you* join other foresighted Executives in buying Elwell-Parker Transportation Systems built literally to your measure? This method will help you *most* to reduce handling costs—and trained Elwell-Parker Engineers are ready to aid you in laying out a cost-reducing handling system.

You have the job—Elwell-Parker has the right transportation equipment and the men for consultation. Better write, right now. Elwell-Parker, 4225 St. Clair Avenue, Cleveland, Ohio.

Transport and deliver in Boxes, Barrels, Bags or Bales. The products of all industry, whether "self-units" or packed in containers, can be handled or shipped at lowest cost in one of these 4 forms.

New Type ELWELL·PARKER *Trucks*

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

Average Work Week Is Still Below 40 Hr.

Changes in Wages, Hours, and Employment Since N.R.A.

AVERAGE hours worked per week in manufacturing industry have increased slightly since the end of NRA, but are still below the average of 40 hr. a week set as a minimum for most industries by NRA in its effort to spread employment.

This fact is brought out in a study of conditions during and subsequent to the NRA period which has just been made public by the National Industrial Conference Board. Interest is now centered on changes that have occurred since the NRA was declared unconstitutional, the Conference Board points out, in view of the possibility that some of its provisions may be re-enacted.

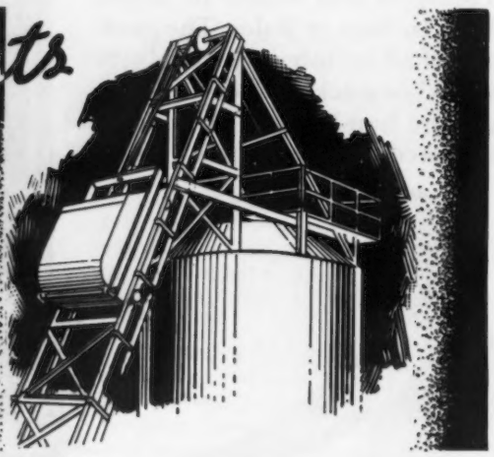
During the NRA period the work week averaged 35.6 hr. Following the declaration of the act as unconstitutional, there was a sharp increase due chiefly to lengthening the work week for workers who had been on part time. As a consequence, average hours worked per week increased to 37.0 for the period from June to December, 1935. The increase in the current year has been slight. For the first nine months of 1936 the work week averaged 38.6 hr.

Hourly earnings today are practically the same as at the end of NRA. It is important to note, however, that during the NRA period they advanced nearly 42 per cent. Employment has increased since the end of NRA and now stands at 86.5 per cent of the 1929 level as against an average of 75.1 per cent of the 1929 level during the NRA period.

Because of the increase in hourly earnings and the lengthening of the work week, weekly earnings are now 15 per cent higher than the average for the NRA period. Real weekly earnings, or the purchasing power of wages, in September, 1936, were 6.4 per cent higher than the average during the period of NRA.

Skip Hoists

SET THE PACE



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BUNKERS—BINS—CHUTES—WEIGH LARRIES

Chapple Visions Large Steel Demand

SPEAKING before the annual meeting of the National Warm Air Heating and Air Conditioning Association, at Chicago, on Dec. 16, Bennett Chapple, vice-president of American Rolling Mill Co., described the role of iron and steel in the heating and housing industries.

Speaking to the assembled convention he stated: "From those early days when the old-fashioned fireplace gave way to stoves and furnaces, sheet metal has been a part of your life. But your demand was conservative. Hand mills had no difficulty in keeping you supplied with all the sheet iron you needed. Now what's happened? The whole civilized world, it seems, has turned to products made of sheet metal. Not only is the air conditioning industry leaping forward, but everything else—household appliances, automobiles, streamlined trains. On every side is a mounting demand for sheet metal.

"Where would we be today if there were none but the old-fashioned hand mills to serve the greatly increased demand for sheet

metal? The obvious point I want to make is that the invention and perfection of the continuous rolling mill is one of the bright spots in the development of the heating and ventilating business, as it is to the whole sheet metal world. Twenty-one of these new continuous mills have been built under Armco's license by the great steel companies, at a cost of more than $250,000,000. Today these mills are producing sheets at the rate of 2 tons per min., and therein lies safety for your expanding industry—the volume production of the steel sheets so vital to the tremendous development ahead in the great air conditioning market.

"In fact, you are marching forward arm in arm with at least three great industries—the electrical industry, with its marvelous development and control of air heating, humidifying and moving equipment; the insulation industry, with its research and practical applications, and the steel industry with its almost limitless supply of sheets. This is a happy situation to be in.

"New business—new houses—old houses remodeled! All kinds of business awaits you. We are literally millions of houses behind in this country and more millions of actual remodeling jobs behind. Authorities agree that if we build as many houses each year for the next ten years as we built during our peak years, when we built 400,000, we would still be far behind the normal demand. Many years of real activity—the kind of activity that means full-time operation, greater employment, and more profit—lie directly ahead of us."

Low-Alloy Steels for Welded Construction

LARGELY as a result of the precipitation hardness effects available with low-alloy steels containing approximately 1 per cent copper, yield point and ultimate strength can be substantially increased over low-carbon steels ordinarily used in welded construction, according to A. E. Gibson, executive vice-president of the Wellman Engineering Co., Cleveland. He spoke on the subject of low-alloy steels and welded equipment on Dec. 4, before the Detroit Section of the American Welding Society, of which he is national president.

Precipitation hardening is obtained by heating the welded structure to between 900 and 950 deg. F., but there is always danger of cooling strains being set up. Also the impact value drops materially. If the structure is first normalized, however, he pointed out, the impact value will not be affected. Charpy values drop from 25 in the as-rolled condition to 16 after precipitation hardening. Impact values as high as 34 on the Charpy scale have been obtained with prior normalizing. The elongation remains practically unchanged regardless of the cycle of heat treatment followed. Precipitation hardening has increased a copper-molybdenum steel from 80,000 to 88,000 lb. per sq. in. yield point. Yield points well beyond 100,000 lb. per sq. in. are obtainable in other alloys containing nickel in the proportion of about 0.75 per cent.

The Wellman Engineering Co. has converted a number of cast steel jobs to low-alloy welded construction. Among the examples cited by Mr. Gibson were clam shell buckets for dredges, which they could positively guarantee against breakage. Such welded buckets are sold at a price 25 to 30 per cent higher than the ones made of steel castings, but the absence of breakage has meant in more than one instance that a spare bucket need not be purchased to tide over an emergency. The welded buckets are much lighter in weight and provide greater pay load for equal boom capacity. Clam shell buckets of alloy steels are all heat-treated after welding for grain refinement. They are pit annealed at 1650 deg. F. and are allowed to cool slowly to 1000 deg. by pulling the cover off the pit. They are then

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lifted out and allowed to cool in the air. Air cooling from 1650 deg. F. is likely to produce cracks in the welds.

To overcome the air-hardening effect of the edges of a gas cut plate, it was thought necessary at first to anneal the whole piece in order to make it machineable. Now the practice is merely to reheat the edge with a gas torch and allow it to cool. This procedure brings the hardness back to that of the body of the plate.

One of the most interesting jobs recently put through the Wellman shop was a coal loading mechanism for a railroad dock at Norfolk, Va. The pier construction was not heavy enough to permit the equipment to be made of carbon steel. The Wellman Engineering Co. succeeded in persuading the customer to accept a design in low-alloy steel and got the Carnegie-Illinois Steel Co. to roll the 30-in. beams used in the boom construction. As far as is known, these are the largest steel sections that have been rolled to date of alloy steel. They are approximately 52½ ft. long.

Welding Society to Increase Scope

IN order to increase the scope of the American Welding Society and particularly to coordinate the work of its many technical committees and to cooperate with other engineering and standardizing bodies in the preparation of codes and standards, the society is planning to increase its staff and budget beginning Jan. 1. A general manager and technical secretary are to be added to the present organization with headquarters at 29 West 39th St., New York.

Increased Use of Diesels Forecast

THE advantages of the diesel engine, and probable extensive increases in its application on land, sea and in the air, were discussed at a luncheon last week given by the Diesel committee of the Exposition of Power and Mechanical Engineers in honor of the fortieth anniversary of the introduction of diesel power in this country and in memory of the late Rudolf Diesel, designer of the first practical compression-ignition engine.

Over 300 leaders of industry and engineering heard speakers praise the economies and performances of diesel engines under every conceivable condition; in tractors, automobiles, fishing boats, dirigibles, railroad trains and ocean liners. Among the speakers were: John B. Kennedy; B. C. Heacock, president, Caterpillar Tractor Co.; Prof. R. U. Blasingame, president, American Society of Agricultural Engineers; David Sarnoff, president, Radio Corp. of America; Capt. E. V. Rickenbacker, general manager, Eastern Air Lines; Thomas H. Beck, president, Crowell Publishing Co.; Edward G. Budd, president, Edward G. Budd Mfg. Co.; Edward B. Pollister, president, Busch-Sulzer Brothers Diesel Engine Co.; Col. Robert H. Morse, president, Fairbanks-Morse & Co., and Charles F. Kettering, vice-president, General Motors Corp.

is made IN THIS TOOLROOM

Horses stepped out of harness, internal combustion engines stepped in—and America became a nation of neighbors. Engines grew wings—and continents were spanned, oceans vaulted, the poles of the earth safely circled in days instead of months. Flashing machines took the drudgery of the needle, the labor of the pen, out of human hands—the killing monotony of figures out of human minds. Hot news clicked into hot type with the speed of thought.

History, yes. But turn back to the first pages, where it begins. It took *tools* to make these miraculous machines. Tools, dies, gages, jigs, fixtures. And on these first pages, in a vast number of cases, is written the name Taft-Peirce.

History may be written with *your* product. But whether you make adding machines or airplanes or anything else, there are times when you can make good use of "the most famous toolroom in the world." For here you can obtain a single tool or many—or, in the production department that supplements it, a complete machine with the tools and gages to make it. Always at your service. Write.

THE TAFT-PEIRCE MFG. CO.

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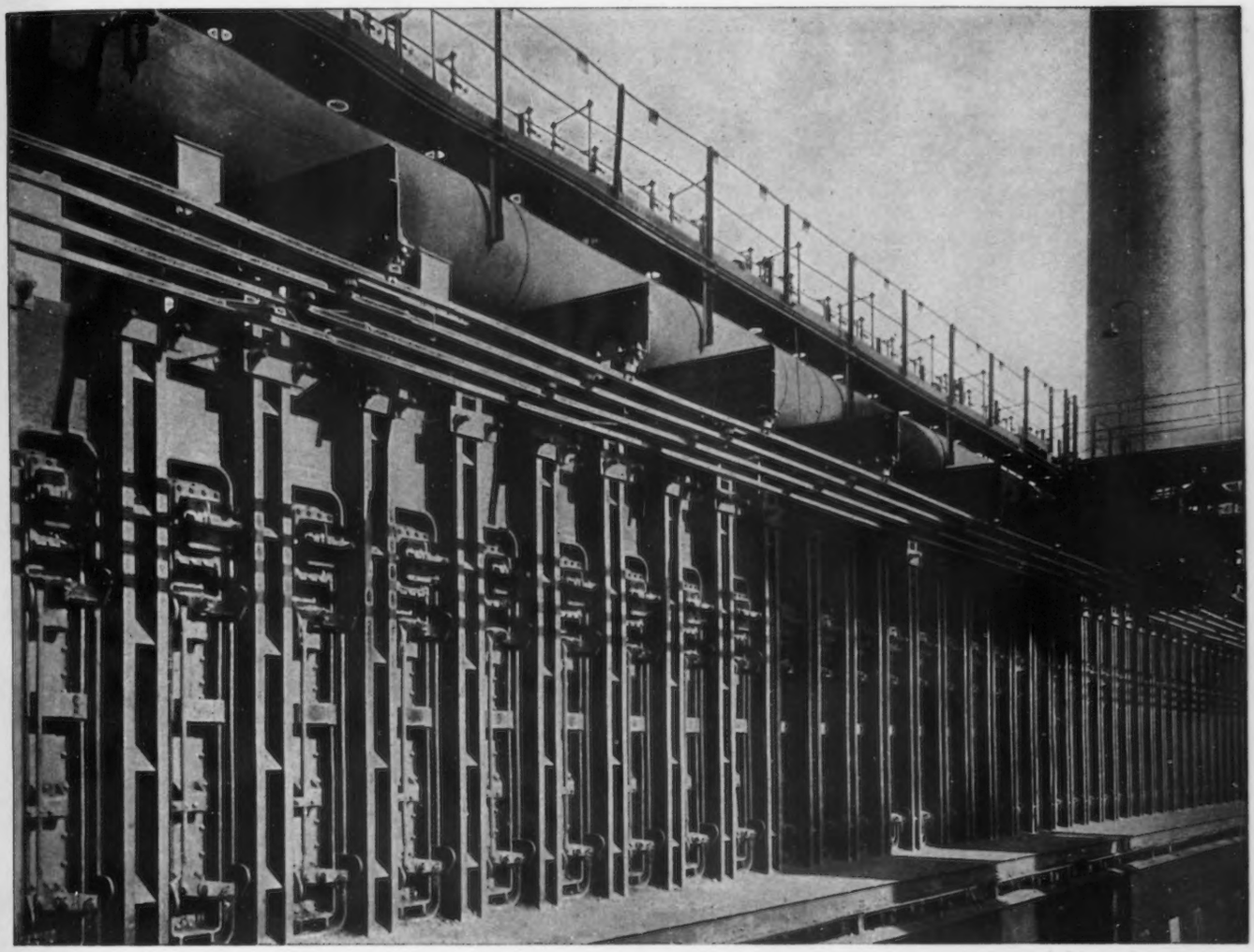
BECKER TYPE
LOW DIFFERENTIAL
BY-PRODUCT COKE OVENS



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- The new BECKER OVENS, characterized by exceptionally low differential pressures represent an advance of prime importance in the economical production of steel. More precise control of coke and gas quality is characteristic of these ovens.
- The pioneer installation at Camden, New Jersey, placed in operation in October, 1935, has already demonstrated a distinct advance in the art of coking. The use of the Becker Type Ovens should be considered in every building and modernization program in the steel industry.

KOPPERS COMPANY

ENGINEERING and CONSTRUCTION

DIVISION

PITTSBURGH, PA.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	November, 1936	October, 1936	November, 1935	Eleven Months, 1935	Eleven Months, 1936
Raw Materials:					
Lake ore consumption (gross tons)[a]	.....	4,384,809	3,025,694	27,760,943	.....
Coke production (net tons)[b]	.....	4,307,849	3,217,175	31,720,422	.....
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	*2,993,434	2,991,887	2,065,913	18,901,349	*27,550,910
Pig iron output—daily (gross tons)[c]	*99,781	96,512	68,864	56,591	*82,242
Castings:					
Malleable castings—production (net tons)[d]	.....	51,778	44,277	420,797	.....
Malleable castings—orders (net tons)[d]	.....	55,521	47,778	410,038	.....
Steel castings—production (net tons)[d]	.....	74,775	36,165	361,195	.....
Steel castings—orders (net tons)[d]	.....	59,431	32,714	359,618	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,337,412	4,545,001	3,150,409	30,344,580	42,487,717
Steel ingot production—daily (gross tons)[e]	173,496	168,333	121,170	106,100	148,558
Steel ingot production—per cent of capacity[e]	79.05	76.70	54.73	47.93	67.69
Finished Steel:					
Trackwork shipments (net tons)[e]	.....	5,547	3,090	39,204	.....
Steel rail orders (gross tons)[e]	123,875	119,237	81,721	445,020	927,940
Sheet steel sales (net tons)[f]	.....	223,195	289,101	2,270,171	.....
Sheet steel production (net tons)[f]	.....	235,057	224,541	2,216,216	.....
Fabricated shape orders (net tons)[g]	.....	127,303	91,693	972,368	.....
Fabricated shape shipments (net tons)[g]	.....	152,999	94,746	1,019,002	.....
Fabricated plate orders (net tons)[d]	.....	33,791	19,116	222,731	.....
Reinforcing bar awards (net tons)[e]	18,740	22,135	11,475	289,315	316,240
U. S. Steel Corpn. shipments (tons)[h]	.....	1,007,417	681,820	6,709,784	.....
Ohio River steel shipments (net tons)[i]	.....	145,065	88,338	864,508	.....
Fabricated Products:					
Automobile production, U. S. and Canada[k]	.....	229,989	411,535	3,760,912	.....
Construction contracts, 37 Eastern States[l]	.....	$225,839,900	$188,115,000	$1,580,408,400	.....
Steel barrel shipments (number)[d]	.....	924,797	634,396	6,331,077	.....
Steel furniture shipments (dollars)[d]	.....	$1,776,784	$1,591,286	$13,965,584	.....
Steel boiler orders (sq. ft.)[d]	.....	968,473	464,431	5,560,423	.....
Locomotive orders (number)[m]	.....	22	0	28	.....
Freight car orders (number)[m]	.....	1,310	25	8,128	.....
Machine tool index[n]	.....	136.5	98.6	†93.8	.....
Foundry equipment index[o]	.....	174.4	100.4	†122.9	.....
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	.....	56,637	45,461	.....
Imports of pig iron (gross tons)[p]	.....	.....	15,550	114,648	.....
Imports of all rolled steel (gross tons)[p]	.....	.....	17,089	193,851	.....
Total iron and steel exports (gross tons)[p]	.....	.....	205,242	2,828,067	.....
Exports of all rolled steel (gross tons)[p]	.....	.....	88,008	812,159	.....
Exports of finished steel (gross tons)[p]	.....	.....	68,324	688,831	.....
Exports of scrap (gross tons)[p]	.....	.....	104,961	1,902,429	.....
British Production:					
British pig iron production (gross tons)[r]	.....	670,300	525,100	5,862,700	.....
British steel ingot production (gross tons)[r]	.....	1,060,500	903,300	9,030,900	.....
Non-Ferrous Metals:					
Lead production (net tons)[s]	.....	42,156	40,369	379,744	.....
Lead shipments (net tons)[s]	.....	59,210	43,035	391,123	.....
Zinc production (net tons)[t]	.....	46,297	37,469	390,949	.....
Zinc shipments (net tons)[t]	.....	54,035	48,172	423,658	.....
Deliveries of tin (gross tons)[v]	5,345	6,005	4,035	53,750	77,075

†Three months' average. *Estimated.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

Weekly Index of Rate Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week	92.5	Same week 1933	49.0
Preceding week	95.2	Same week 1932	36.5
Same week last month	86.6	Same week 1931	50.2
Same week 1935	76.9	Same week 1930	78.0
Same week 1934	47.1	Same week 1929	99.4

ALTHOUGH there was further evidence of improvement in several industries last week, a recession in automotive activity outweighed other factors and THE IRON AGE's general index declined accordingly. The loss brought the activity level down from its preceding high mark for the year of 95.2 per cent of "average" to second place showing of 92.5. This occurred despite the fact that the separate steel, lumber and Pittsburgh indices were each at a new 1936 peak last week. The decrease in car and truck assemblies, reflected by the automobile production index, resulted from the strike at suppliers' plants. While tendency of the heavy construction series was upward, a higher December cost factor reacted to restrict the actual volume of work undertaken.

The general index's present showing of 92.5 contrasts with 86.6 a month ago, 76.9 a year ago and 47.1 two years ago. No corresponding figure for earlier years exceeds this mark except the 99.4 level indicated for 1929 at this time.

As calculated from the weekly records, the capital goods index during November averaged 90.0 per cent of the 1925-27 base period. This established a new monthly record for the year to date, August's 86.5 showing having heretofore held the distinction. The October average was 82.0, or 8.0 points beneath the new monthly peak.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Commodity Price Index Highest Since 1930

COMMODITY prices advanced last week on a wide front, according to *The Annalist* weekly index of wholesale commodity prices, which rose 1.7 points to 131.7 on Dec. 1, the highest since June 3, 1930. Advances were general. "War scares of various sorts may have contributed slightly to the rise, but the advances generally appear to have reflected rather the operation of more natural forces," *The Annalist* comments. "All the grains except barley advanced under the leadership of wheat, as our western areas continued to suffer from lack of moisture and as the close balance of world supply and demand responded to Italian purchases for import. The textiles were generally higher, silk, however, declining somewhat from its recent high mark as November consumption proved less than had been expected. Steers and hogs and the meats generally were higher, as were potatoes and cocoa. Rubber and steel prices also advanced. Losses were reported for butter and cheese, lemons and tin."

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This operator is equipped to give a *good account* of himself and his machine—in *volume* of work, in *quality* of work, in *economy* of production.

He has at his command *every* machine speed he needs, instantly made available through the REEVES Variable Speed Transmission. For every varying production requirement, he adjusts to the proper machine speed. It becomes "second nature" to use the *right* speed. Contrast this with a machine limited to a fixed, inflexible speed. *Too slow* for some operations—*too fast* for others.

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FREE to plant executives—this valuable book on modern speed control; has over 200 illustrations and diagrams.

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Describes and pictures variable speed control used in over 16,000 plants and on 1150 different makes of machines as standard equipment.

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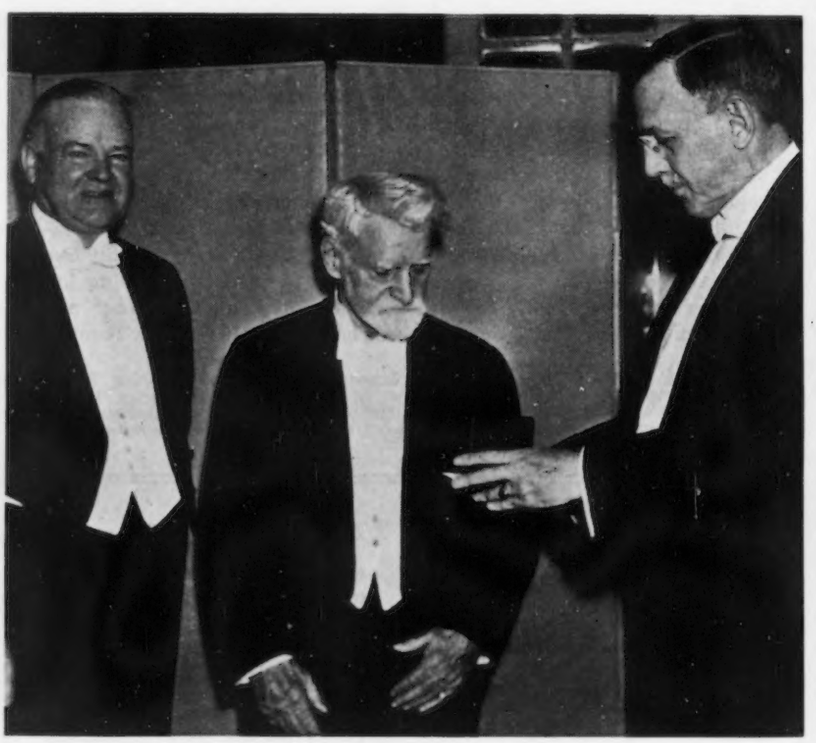
..PERSONALS..

C. E. Hoyt and D. M. Avey Elected To New Positions in A. F. A.

THE executive committee of the Board of Directors of the American Foundrymen's Association, at a meeting held in Chicago, Dec. 4, elected Charles Edgar Hoyt, for the past 18 years executive secretary-treasurer, to the position of executive vice-president. At the same meeting, Dan M. Avey, formerly vice-president and director of the Penton Publishing Co. and editor of *The Foundry*, was elected secretary-treasurer, effective Jan. 1, 1937.

C. E. Hoyt, on finishing school, became associated for a time with his father in operating a jobbing and machine shop. He then accepted a position with Michigan State College, East Lansing, Mich., in charge of pattern shop and foundry work. He held this position for three and a half years, resigning to accept a position on the engineering faculty of Lewis Institute, Chicago. On locating in Chicago, Mr. Hoyt took an active part in association work, first as a member of the Western Foundrymen's Association, then as secretary-treasurer of the Chicago Foundry Foremen's Association. When the A.F.A. was incorporated in 1916, Mr. Hoyt was one of the signers of the application for a charter and was elected a director, in which capacity he served for several years. When the association established a war service office in 1917 in Washington in response to a Government request, Mr. Hoyt was placed in charge, resigning from the faculty of Lewis Institute, which position he held during these years of association activities. At the 1918 convention, he was elected secretary-treasurer of A.F.A., succeed-



AMBROSE SWASEY, chairman, Warner & Swasey Co., receiving the Hoover Medal, for distinguished public service, at the recent annual dinner of the American Society of Mechanical Engineers. From left to right: The Hon. Herbert C. Hoover; Ambrose Swasey; and Gano Dunn, chairman of the board of award.

ing A. O. Backert, who resigned to accept the presidency. In 1926 he was made executive secretary-treasurer.

Dan M. Avey, the new secretary-treasurer, has long been identified with the work of A.F.A. He has served as chairman, member or representative on many important committees, including those on international relations, program and papers and the joint committee for standardization of foundry equipment and supplies, and as director in 1931 and 1932, vice-president, 1933, and two terms as president, 1934 and 1935. He also has served as secretary of the Foundry Equipment Manufacturers Association.

Born in Charleston, Ill., Mr. Avey was educated in the public schools of Mattoon, Ill., and in 1910 was graduated from the University of Illinois. Subsequently, he was successively associate editor, *Municipal Engineering*, Indianapolis, assistant to the director and in charge of publications of the Engineering Experiment Station, University of Illinois, and assistant cashier in a Mattoon bank. Late in 1917, he became associate editor, *Iron Trade Review*. In 1919, he was made managing editor of *The Foundry*, and editor in 1926. In 1936, he was made vice-president and director of the Penton Publishing Co.

Hoover Medal To Ambrose Swasey

AMBROSE SWASEY, chairman, Warner & Swasey Co., Cleveland, received the Hoover Medal at the annual dinner of the American Society of Mechanical Engineers, held at the Hotel Astor, New York, Dec. 2.

The Hoover medal is awarded by engineers to a fellow engineer for distinguished public service. It was proposed and perpetually endowed by Conrad N. Lauer, of Philadelphia, and is jointly awarded by a board of representatives of four national engineering societies, namely the American Society of Civil Engineers, American Institute of Electrical Engineers, The American Society of Mechanical Engineers, and the Institute of Mining & Metallurgical Engineers. The first recipient was the Hon. Herbert C. Hoover.

Gano Dunn, president, J. G. White Engineering Corp., and chairman of the board of award, presented the medal, and speakers on this memorable occasion included the Hon. Herbert Hoover and Dr. Harlow Shapley, director, Harvard Observatory, who deliv-

Transport

AND THE CARS YOU RIDE IN

Courtesy Union Pacific Railroad

THE REBIRTH of the railroads as America's most luxurious mode of travel is a saga which captures the imagination of every business executive. Four years ago airplane, motor car and bus were pushing the railroad passenger train into the same musty pigeon hole where the trolley car had already been filed. Today America's most alert citizens are again traveling by rail.

The change did not come by chance. Railroad tycoons, with fingers on the public pulse, keenly analyzed the modern idea—speed, comfort, safety.

High speed, streamlined trains, air-conditioned and luxurious in their appointments, have made their appearance on a dozen of the country's greatest transportation systems. Filled to overflowing on every trip, they have placed the railroads once more in the forefront of modern passenger transport.

Only new methods of construction and new materials, unknown a decade ago, have made possible this remarkable change. Lebanon Castings, of high strength alloy steel, are contributing materially to the successful operation of many of these trains. They have made possible decreased weight, increased strength and safety factors, and reduction of vibration to meet the stern demands of speeds which were not even contemplated when existing roadbeds were built.

Your Products, Too

In every industry the urge of modernity is necessitating the adoption of new materials. Of these the new alloy steels are among the most significant.

Lebanon blazed a trail in the making of alloy steel castings which has already become a broad and well marked highway for design engineers to follow. Our metallurgists and engineers will gladly work with yours in applying these new materials to your particular products.

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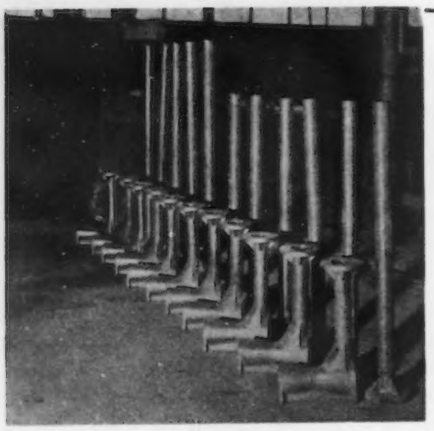
CIRCLE L *Stainless and Special Alloy Steel Castings*



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They must resist the corrosive attack of pickling solutions.
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They must stand up under accidental bumps received from material being handled.
Therefore—have them made from tough, durable corrosion- and erosion-resistant alloys, if you want satisfactory service.

Ampco Metal Grade 18 steam jets are proving their durability in the daily operating service of many plants. Write for quotations.

AMPCO METAL, INC.

MILWAUKEE, WISCONSIN

ered the Thurston Lecture and the Ambrose Swasey Eulogium under the title of "Ninety Years of Stellar Exploration." William L. Batt, president, SKF Industries, Inc., and president of the A.S.M.E., was toastmaster.

The award practically coincides with Mr. Swasey's 90th birthday, and with it he holds all the major honors within the power of his fellow engineers to bestow. He was presented with the John Fritz Gold Medal in 1924, having been previously (in 1921) been made an officer in the French Legion of Honor in recognition of his achievements in the design and construction of scientific instruments. In 1932 the Gold Medal of the Franklin Institute was conferred upon him, and the following year he was recipient of the A.S.M.E. medal. In 1935 he received the Washington Award, administered jointly by the four national engineering societies and the Western Society of Engineers.

In addition, Mr. Swasey has been the recipient of honorary degrees from several universities, including Denison University, University of California, University of Pennsylvania, University of Rochester, University of New Hampshire, Brown University and Case School of Applied Science.

Mr. Swasey was born in Exeter, N. H., and began his career in the mechanical industries at the age of 18 as an apprentice in the Exeter Machine Works. A fellow apprentice was Worcester R. Warner, with whom he formed a close friendship, and later a life-long business partnership. In 1869 both Mr. Swasey and Mr. Warner found employment at the Pratt & Whitney Co., Hartford, Conn. In 1880 they opened a small shop in Chicago and a year later transferred their business to Cleveland.

Mr. Warner had long been interested in astronomy and this, together with Mr. Swasey's absorbing interest in the building of highly accurate machinery, evoked a common urge to develop finer mechanisms for study of the stars. A 9-in. telescope of unusual quality initiated the partners into the building of a succession of notable telescopes. These included the 36-in. refractor for the Lick Observatory, completed in 1888; the 26-in. equatorial telescope for the Naval Observatory at Washington in 1892, the Yerkes telescope for the University of Chicago, and others, the most recent of which is the 82-in. reflector now being erected at the McDonald Observatory. One outgrowth of this astronomical work was the famous "dividing engine" built at the Warner & Swasey plant for use in the Naval Observatory at Washington.

Mr. Swasey is a past president of the A.S.M.E., and an honorary member of the A.S.M.E. and several other societies. His many benefactions include the initial gift, in 1914, which established the Engineering Foundation, "for the furtherance of research in science and engineering, or for the advancement in any other way of the profession of engineering for the good of mankind."

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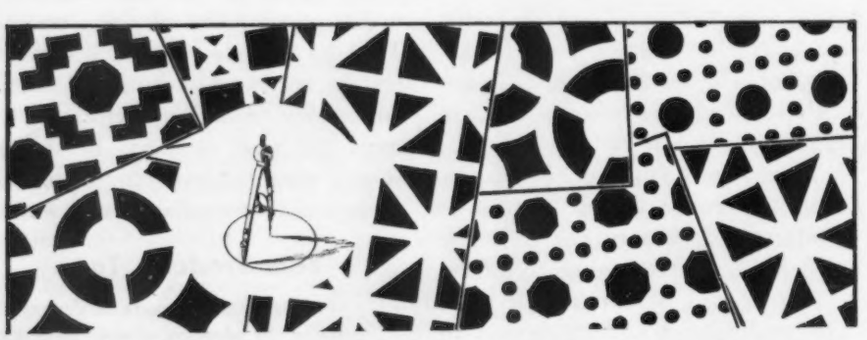
F. LLOYD WASSELL, for the past 14 years identified with the Remington Rand Co., first as district manager and then as general sales manager, has been appointed vice-president in charge of sales of the



DESIGNS, *Planned Scientifically*

Wissco Perforated Metal designs are not only attractive but extremely practical. They are scientifically planned to give a minimum obstruction to air passage and maximum concealment.

WICKWIRE SPENCER STEEL COMPANY, 37 East 42nd St., New York City
Buffalo Worcester Chicago San Francisco

Send for this folder showing a variety of patterns.

WICKWIRE SPENCER perforated metals

Automatic Business Machines, Inc., Pittsburgh. Previous to his association with Remington Rand, he was assistant secretary of the Westinghouse Air Brake Co.

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WILLIAM E. UMSTATTD, president of the Timken Roller Bearing Co., Canton, Ohio, has been elected president of the Timken Steel & Tube Co., a wholly-owned subsidiary, succeeding FREDERICK J. GRIFFITHS, who has resigned. H. H. TIMKEN, JR., previously a vice-president of the Tube company, has been made executive vice-president, in addition to his present capacity as vice-president and director of the Timken Roller Bearing Co. W.

HARRY H. HOLLOWAY, whose appointment as assistant manager of the Cleveland district of the Republic Steel Corp. was announced in The Iron Age last week.

ROBERT TIMKEN has been elected director of the Roller bearing company and of the Steel & Tube company, to fill Mr. Griffiths' unexpired term. JOHN E. FICK has been appointed general superintendent of the steel and tube mills of the Roller Bearing company, succeeding K. B. BOWMAN. Mr. Griffiths was chairman of the former Central Alloy Steel Co., now a part of Republic Steel Corp.

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MACE H. BELL, formerly with the United States Engineers Office at Zanesville, Ohio, as assistant engineer on design and construction of dams on the Muskingham Conservancy project, has joined the staff of the American Institute of Steel Construction, New York, and has been appointed district engineer to cover the Southwestern territory, with headquarters at New Orleans. L. H. DODD has moved from Dallas to take over the St. Louis office, succeeding ROBERT J. WOOD, who has taken a position with the Mississippi Valley Structural Steel Co.

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CECIL G. ROUSH, heretofore of the sales division of the Kansas City office of the Westinghouse Electrical & Mfg. Co., East Pittsburgh, Pa., has been made manager of that office, effective Jan. 1. C. W. HAMILTON, formerly in charge of the Kansas City office, is being transferred to another activity of the Westinghouse company. Mr. Roush was graduated from the University of Oklahoma in 1923 and has been identified with the company since that time.

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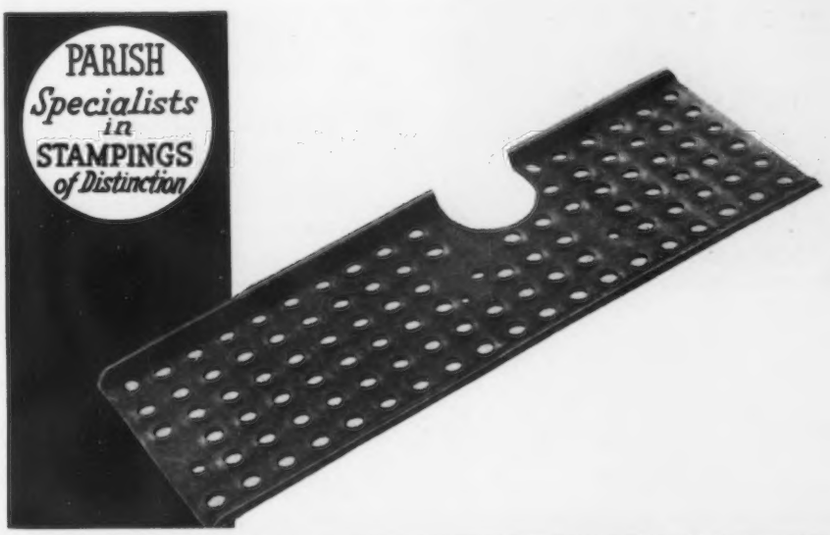
ERNEST T. FISHER, formerly superintendent and assistant manager of the Illinois Foundry Co., Springfield, Ill., has been appointed sales engineer of the Claude B. Schneible Co., Chicago, covering



Safety for the Brakemen

Neither the gauge, size nor specifications of a stamping presents any obstacle to Parish. Skill, experience and equipment combine to make difficult stampings comparatively easy in Parish shops.

This non-skid brake step for box cars is 1/4" thick x 30" long x 10" wide. The flange is 1". Embossing around the holes makes the step non-skid. Another of the many types of stampings produced by Parish for many industries.

Have you a problem that could be worked out in pressed metal? Our engineers will do it for you.

PARISH PRESSED STEEL CO., Reading, Pa.

PACIFIC COAST REPRESENTATIVE
F. Somers Peterson Co., 57 California St., San Francisco, Calif.

The "CLINCHOR"

Feeds and Sets CLINCH NUTS Automatically

A NEW TYPE of machine answering the demands for better production methods for setting Clinch Nuts.

The clinch nut, which has been automatically placed on the anvil, locates the work. The ram coming down sets the clinch nut.

May we send you a circular describing the many details so important for successful production?

THE TOMKINS-JOHNSON CO.

628 N. Mechanic St., Jackson, Michigan

European Office

GASTON E. MARBAIX, Ltd., Vincent House, Vincent Square, London, S. W 1, England

the territory contiguous to St. Louis.

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MEL KORDENBROCK, at present Detroit representative of the Lodge & Shipley Machine Tool Co., will become associated with the Sterling-French Machinery Co., Detroit, as sales engineer.

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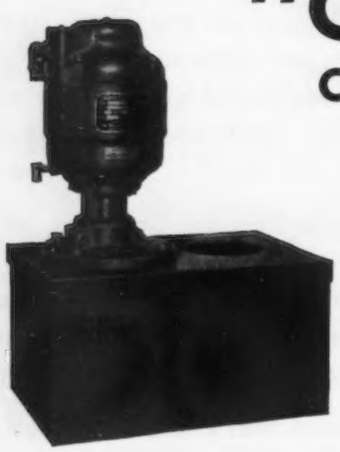
LEON SMITH has been made representative in Maine for the Magnus Chemical Co., Garwood, N. J.

EDWARD HILL, formerly superintendent of open-hearth No. 4 at the Homestead works of Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed assistant superintendent of the open-hearth department of the Duquesne works. ROBERT L. FATZINGER, assistant superintendent of open-hearth department at Duquesne, has been appointed superintendent of open-hearth No. 4, at the Homestead plant.



"GUSHER"

COOLANT PUMPS

are economical because they are efficient and operate on a minimum amount of power.

Ballbearing construction, freedom from stuffing boxes and the elimination of metal contacts, make this possible.

Do you have the latest engineering data covering GUSHER PUMPS. If not, write for a copy today.

THE RUTHMAN MACHINERY COMPANY

537 East Front St., Cincinnati, Ohio

W. G. HUME has been appointed manager of sales of wire products for the Pittsburgh Steel Co. Mr. Hume began his business career in the St. Louis office of the company in 1911. In 1915 he became assistant sales manager of Keystone Steel & Wire Co., and in 1925 was made general sales manager of that company. Since 1929 he has been assistant to the president of Northwestern Barb Wire Co., Sterling, Ill. WILLIAM STEYTLER has been transferred to the Philadelphia office of the Pittsburgh Steel Co. as district sales manager, and C. L. WADE has been transferred from the Philadelphia office to the Pittsburgh office.

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A. T. HUNT, formerly general sales manager of the Eastern Rolling Mill Co., Baltimore, is now with the sheet sales division of the Bethlehem Steel Co.

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MRS. EMMA S. TRIMBORN has been elected president of the Milwaukee Bridge Co., Milwaukee, to succeed her husband, the late Conrad Trimborn, founder and president-treasurer of the firm. HENRY A. TRIMBORN succeeds his father as treasurer. HENRY A. MERZ continues as vice-president, and CONRAD TRIMBORN, JR., as secretary.

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F. J. VEA, widely known industrialist of Stoughton, Wis., has been appointed general manager of the Trailer Co. of America, Cincinnati. He formerly was president and general manager of the Stoughton Wagon Co., and its successor, New Stoughton Co., which is being liquidated.

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HAROLD JOHNSON is now superintendent of the methods and equipment division of the Cadillac Motor Car Co., Detroit. He replaces ROBERT C. BLACKINTON, resigned. Mr. Johnson has been with the Cadillac organization on and off since 1915 and has been connected continuously with the company since 1919, when he reentered the organization as a tool designer. From this position he advanced to checker and chief checker before becoming tool engineer in charge of crankshafts in 1924. Later he supervised tool engineering on the entire motor, and has been chief tool engineer of the company since 1932 and up until the time of his recent advancement.

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OTTO W. FRANKE, for the past year assistant to Edward J. Hunt, master mechanic, Plymouth Motor Corp., Detroit, has assumed

that position. Mr. Hunt has been transferred to the general master mechanic's staff of the Chrysler Corp. Mr. Franke has been in Detroit on and off since 1916. He began his work in the automotive industry with Packard Motor Car Co. as a tool designer and also held a similar position with the Cadillac Motor Car Co. In 1928 he was tool engineer at the Jefferson Ave. plant of Chrysler Corp., leaving for the period of 1928-29 to represent the Hutto Engineering Co. in the New England territory as sales engineer. In the period 1929-31, he represented the Micromatic Hone Co. in Cleveland and Chicago. In 1931 he joined the Plymouth organization and was in charge of tool operations before becoming assistant to Mr. Hunt in December, 1935.

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HERMAN BALSAM, heretofore sales representative in the Tri-Cities area of Illinois and Iowa for the Union Drawn Steel Co., Massillon, Ohio, has resigned.

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THOMAS BARLOW has been added to the division of process metallurgy of the Battelle Memorial Institute, Columbus, Ohio.

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HARRY BECK has been appointed Chicago district sales manager of the Super Tool Co., Detroit. He will make his headquarters at 656 Washington Boulevard.

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A. C. HEMPEL has been made Eastern representative, with office at 512 Fifth Avenue, New York, for the Lake Erie Engineering Corp., Buffalo.

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ARTHUR ECKHARDT, who formerly represented the Magnus Chemical Co., Garwood, N. J., in Iowa and Illinois, has been appointed to represent the company in Texas.

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MILTON LEVENSON, of the Roxbury Iron & Metal Co., Dorchester, Mass., has been elected president of the Boston chapter of the Institute of Scrap Iron and Steel. Other officers elected include: First vice-president, SIMON EDINBURG, second vice-president, GEORGE J. BRESTH; treasurer, MORRIS KAFKER, and secretary, WILLIAM G. MITCHELL.

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A. R. ROBINSON, of R. L. Batteiger Co., Philadelphia, has been elected president of the Philadelphia chapter of the institute. LEWIS RAPHAELSON has been made vice-president, PHILIP BAILIS, treasurer, and T. BANTIVOGLIO, treasurer.

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D. SLOAN HURWITZ, of the Hurwitz Brothers Iron & Metal Co., has been elected president of the Western New York chapter. N. H. JACOBS has been made vice-president, and JOHN E. FARRELL, secretary-treasurer.

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STANLEY A. KNISELY, director of advertising of the Republic Steel Corp. and its subsidiaries, Cleveland, has been elected vice-president of the National Industrial Advertisers Association, succeeding D. Clinton Grove, who has resigned because of pressure of other work. Mr. Grove is advertising manager of the Blaw-Knox Co., Pittsburgh. Mr. Knisely has had a widely diversified experience in both newspaper and advertising fields and was instrumental in the organization of the Youngstown District Industrial Marketers, now a chapter of the N.I.A.A.

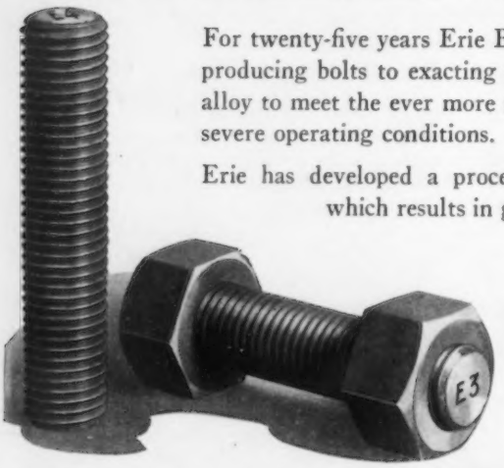
☆ SMOOTH SAILING! ☆

The safety of his passengers, his cargo and his ship is the unceasing concern of the sea captain. The caution he exercises springs from an ingrained respect for the dangerous hazards of the sea. ★ ★ The metal finishing operator who feels a similar responsibility, risks no part of his plating or polishing operations to chance. Against inferior finish, expensive production jams, high operating and material costs, he protects his production with Udylite polishing and plating equipment and supplies. ★ ★ Udylite maintains a staff of trained service men to assist you in choosing the proper buff . . . the proper plating barrel . . . the "right" supply or equipment item best suited to your purpose. ★ ★ Udylite branch offices are conveniently located within easy calling distance. No matter what your requirement might be, if it concerns polishing or plating, Udylite "stands by" ready to help you chart your course for smooth sailing during 1937.

THE UDYLITE COMPANY
1651 E. Grand Blvd., Detroit, Mich.

New York 30 E. 42nd Street | Chicago 1943 Walnut Street | Cleveland 3796 Carnegie Ave. | San Francisco 114 Sansome Street

ERIE BOLTS



For twenty-five years Erie Bolt & Nut Company has been producing bolts to exacting standards made of the proper alloy to meet the ever more rigid specifications imposed by severe operating conditions.

Erie has developed a process of manufacturing threads which results in great accuracy and smoothness of thread, thereby eliminating, to some extent, seizure under high temperatures.

Write for two new close tolerance thread specifications developed by Erie.

ERIE BOLT & NUT CO.
ERIE, PENNSYLVANIA

...OBITUARY...

HARRY ROSS JONES, who before his retirement in December, 1935, was engaged in organizing the alloy steel division of the Youngstown Sheet & Tube Co., died suddenly in Canton, Ohio, on Dec. 4. He was one of the pioneers in the manufacture of alloy steels and was formerly president of the United Alloy Steel Corp.

He was born June 27, 1869, in Youngstown, where he received his formal schooling and where he studied structural and bridge engineering. In 1889 he became associated with the Youngstown Bridge Co. and two years later was transferred to that company's Cleveland office. For the next few years he was identified with the Columbus Bridge Co., Columbus; Variety Iron Works Co., Cleveland, where he remained until 1889, when he resigned to become a junior partner with the Osborn Engineering Co. After spending a year at Atlanta, Ga., with the Southern States Portland Cement Co., he returned to Ohio in 1904 to take charge of the United Steel Co., of which he subsequently served as secretary and treasurer, general manager, vice-president, and president of the United Alloy Steel Corp., which was formed in 1916. Under his management this company became a leader in commercial development of alloy steels, having been among the first to develop vanadium and molybdenum steels on a large tonnage basis. He resigned as president of the company in 1921. He was asked to organize an alloy steel division for the Youngstown Sheet & Tube Co. in 1933 and completed this work in 1935. He was active in civic affairs and had been a member of the American Iron and Steel Institute since 1908.

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EDWIN MOREY, for a number of years in charge of operations at the Nashua, N. H., Flather lathe manufacturing plant, died at a hospital in that city on Dec. 4, after a long illness. He was born in Lexington, Mass., 51 years ago. He was graduated from Tufts College in 1909.

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WILLIAM SIEGER, assistant superintendent of the machine division at Hudson Motor Car Co., died suddenly on Nov. 25, aged 59 years. Mr. Sieger had been connected with Hudson in this position for the past six years, having started there 10 years ago as a foreman. Previous to this time, he was employed at Continental Motor Co. for 12 years in a supervisory capacity. Before becoming connected with Continental, he was with Northway Motors for six years.

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WILLIAM WEARNE, who until his retirement in 1935 was superintendent of the Laura Iron Mine on the Mesaba Range for the Inland Steel Co., Chicago, died at his home in San Diego, Cal., on Nov. 30, aged 64 years. He had been associated with the company since 1906.

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LEOPOLD WOLF, Cincinnati scrap iron and steel broker, died in that city on Nov. 26 after a long illness. He was 56 years old. He was a member of the firm of Hilb & Bauer, scrap iron and steel brokers.

NO PACKING . . .

and no leakage or maintenance troubles with Hannifin disc type air control valves. Simple, effective design means positive control of air operated machinery—with worthwhile economy. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY
621-631 SOUTH KOLMAR AVENUE
CHICAGO, ILLINOIS
ENGINEERS • DESIGNERS
MANUFACTURERS
Pneumatic and Hydraulic
Production Tool Equipment

HANNIFIN "Packless" AIR CONTROL VALVES

FABRICATED STEEL

Lettings total 14,600 tons.

o o o

New projects call for 30,420 tons.

NORTH ATLANTIC STATES

Cambridge, Mass., 350 tons, Lever Brothers plant unit, to New England Structural Co., Everett, Mass.

Queens, N. Y., 175 tons, highway bridge, to American Bridge Co.

Staten Island, N. Y., 180 tons, Wallerstein Co. building, to H. R. Goeller Co., Inc., Hillside, N. J.

Montrose, N. Y., 170 tons, grade crossing elimination, to American Bridge Co.

Herkimer County, N. Y., 100 tons, highway bridge, to Fort Pitt Bridge Works Co.

Corning, N. Y., 200 tons, building, Corning Glass Co., to Rogers Structural Steel Co., Corry, Pa.

Fulton, N. Y., 210 tons, storage building, Armstrong Cork Co., to Smith & Caffrey Co., Syracuse, N. Y.

Braddock, Pa., 300 tons, Home Furniture Co. store, to Levinson Steel Co.

Wilkes-Barre, Pa., 1225 tons, viaduct, to Bethlehem Steel Co.

Johnstown, Pa., 570 tons, Franklin Street bridge, to Bethlehem Steel Co.

Plainfield, N. J., 500 tons, factory building, American Rock Wool Corp., to Harris Structural Steel Co., Plainfield, N. J.

Bound Brook, N. J., 335 tons, Calco Chemical Co. building, to Bethlehem Steel Co.

Pleasantville, N. J., 160 tons, Absecon Boulevard crossing elimination, to Phoenix Bridge Co., Phoenixville, Pa.

Bridgeton, N. J., 600 tons, Owens-Illinois Glass Co. building, to Bethlehem Steel Co.

Luzerne County, Pa., 140 tons, highway bridge, to Bethlehem Fabricators, Inc.

Philadelphia, 420 tons, crane runway at Navy Yard, to Lehigh Structural Steel Co.

Gloucester, Pa., 365 tons, Hinde & Dauch Paper Co. addition, to Belmont Iron Works.

Wyoming County, Pa., 128 tons, highway bridge, to Bethlehem Steel Co.

State of Pennsylvania, 130 tons, highway bridge, to Fort Pitt Bridge Works Co.

Annapolis, Md., 335 tons, extension to Isherwood Hall, Naval Academy, to Bethlehem Fabricators, Inc.

Washington, 550 tons, office building, W. H. Walker, to Barber & Ross Co.

SOUTH AND SOUTHWEST

Fairmont, W. Va., 120 tons, turbine foundation, to Fort Pitt Bridge Works Co.

Glasgow, Va., 610 tons, extension for Blue Ridge Co., to Belmont Iron Works.

Newport News, Va., 185 tons, Montgomery Ward & Co. building, to Hall-Hodges & Co.

Vernon, Tex., 660 tons, bridge, to Austin Brothers, Dallas, Tex.

Mesa, Ariz., 105 tons, regulating gate, to Consolidated Steel Corp.

Albuquerque, N. M., 205 tons, gymnasium, to Darbyshire & Harvie Iron & Machinery Co., El Paso, Tex.

Terral, Okla., 260 tons, bridge, to Bethlehem Steel Co.

CENTRAL STATES

Detroit, 320 tons, factory building, to Jones & Laughlin Steel Corp.

Warren, Ohio, 120 tons, building for U. S. Gypsum Co., to Rogers Structural Steel Co.

Ashtabula, Ohio, 300 tons, turbine supports, Cleveland Electric Illuminating Co., to American Bridge Co.

Chicago, 280 tons, manufacturing building, Caspers Tin Plate Co., to Vierling Steel Works, Chicago.

Sugar Grove, Ill., 260 tons, railroad bridge, to Worden-Allen Co., Milwaukee.

Streator, Ill., 160 tons, furnace steel, to Belmont Iron Works.

St. Louis County, Minn., 110 tons, bridge, to Minneapolis-Moline Power Implement Co.

Cedar Rapids, Iowa, 350 tons, highway bridge, to Iowa Steel & Iron Works, Cedar Rapids.

Hastings, Iowa, 300 tons, building, to Paxton & Vierling Iron Works, Omaha, Neb.

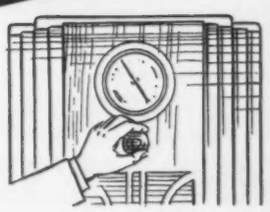
Eau Claire, Wis., 200 tons, sanitarium, to W. H. Hobbs Supply Co.

Eau Claire, 150 tons, waterworks, to W. H. Hobbs Supply Co.

Mineral Point, Wis., 200 tons, building, to Wisconsin Bridge & Iron Co., North Milwaukee.

ONLY SMOOTHARC WELDERS HAVE THIS PATENTED EXCLUSIVE FEATURE OF

SINGLE CURRENT CONTROL



AS SIMPLE AS TUNING A RADIO

Smootharc Single Current Control is as modern and effective as single dial control and tuning in radio receivers

Single, automatic current control which provides easier, faster and superior welding is a patented, exclusive feature of Smootharc Welders... The current setting, shown by a clear reading indicator, is automatically and positively maintained by the Smootharc generator under continuous duty—without further attention by the operator or the manipulation of complicated dual control devices... Only Smootharc Welders have this patented feature of Single Current Control. Investigate and test this outstanding feature. Send for bulletin giving complete information.

HARNISCHFEGER CORPORATION
4401 W. NATIONAL AVE. MILWAUKEE, WISCONSIN

K-28

SMOOTHARC WELDING WITH SMOOTHARC WELDERS ...FOR SUPERIOR PERFORMANCE

Tarkio, Mo., 100 tons, bridge, to Gate City Iron Works, Omaha.

WESTERN STATES

Lincoln County, Mont., 150 tons, bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

Denver, 1200 tons, railroad overpass, to American Bridge Co.

Sacramento, Cal., 500 tons, Third Street approaches, to Bethlehem Steel Co.

San Pedro, Cal., 125 tons, San Pedro High School, to Minneapolis-Moline Power Implement Co.

Los Angeles, 100 tons, Lincoln High school, to Minneapolis-Moline Power Implement Co.

Los Angeles, 100 tons, Jefferson high school, to Minneapolis-Moline Power Implement Co.

Los Angeles, 303 tons, three bridges for United States Engineers, to an unnamed bidder.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Manchester, N. H., 700 tons, MacGregor bridge.

Hollis-Buxton, Me., 588 tons, Bar Mills bridge.

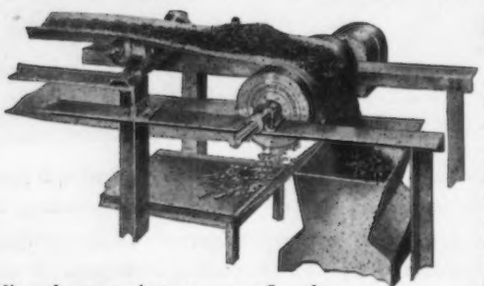
Hollis-Buxton, 578 tons, West Buxton bridge.

Boston, 500 tons, fish-freezing and storage plant.

Atlantic and Hunterdon Counties, N. J., 290 tons, bridges.

New York, 350 tons, building alterations, F. H. T. Holding Co.

IRON PROBLEMS SOLVED



Are YOU having trouble with iron? Dings Engineers can eliminate it!

Dings Engineers can effectively remove iron from your foundry sand, leaving it clean for reuse. They can remove iron or steel from brass borings or turnings, making them suitable for salvage and assuring great savings in tools when remachining.

Iron in any form from the finest material to coarse tramp iron can be removed in the regular order of production.

Don't waste time and money because of iron troubles.

Come to Separation Headquarters.

No other manufacturer can offer the experience that is Dings. Since 1899 Dings Engineers have been solving separation problems. This experience has resulted in a line of High Intensity Separators that will extract the most weakly magnetic materials—even slate from coal or protect crushing and grinding equipment from the coarsest tramp iron.

Dings High Intensity MAGNETIC SEPARATION

DINGS MAGNETIC SEPARATOR CO.
727 Smith Street, Milwaukee, Wis.

Separation Headquarters Since 1899

Borough of Queens, N. Y., 1975 tons, two bridges, WF-36-5 and WF-36-4.

Tonawanda, N. Y., 250 tons, railroad bridge.

Depew, N. Y., 1000 tons, Transit Road grade crossing elimination over New York Central, Lehigh Valley and Erie railroads.

Buffalo, 125 tons, National Aniline & Chemical Co. addition.

Allegheny County, Pa., 500 tons, repairs to Glenwood bridge.

Ambridge, Pa., 400 tons, high school addition.

Easton, Pa., 4500 tons, bridge over Delaware River; bids to be taken Dec. 21 by Delaware River Joint Toll Bridge Commission.

Somerset-Cambria Counties, Pa., 170 tons, highway work; bids Dec. 18 at Harrisburg.

Jefferson County, Pa., 153 tons, highway work; bids Dec. 18.

Chester County, Pa., 600 tons, two highway projects; bids Dec. 18.

Point of Rocks, Md., 1700 tons, Potomac River bridge.

THE SOUTH

Balcony Falls, Va., 625 tons, bridges for Chesapeake & Ohio Railroad.

Owensboro, Ky., 1000 tons, warehouse.

State of Florida, 675 tons, three buildings.

CENTRAL STATES

Lorain County, Ohio, 800 tons, grade crossing elimination bridge; bids Dec. 15.

Detroit, 325 tons, Chrysler Oilite Division; J. A. Utley, Detroit, general contractor.

Ecorse, Mich., 400 tons, factory building, Bowen Products Co.

Trenton, Mich., 650 tons, L. A. Young Spring & Wire Co. factory building.

Cincinnati, 300 tons, buildings, Hilton Davis Chemical Co.

Lafayette, Ind., 1200 tons, field house and gymnasium, Purdue University.

Hammond, Ind., 400 tons, civic auditorium.

Boston, Ind., 300 tons, railroad bridge.

Rockford, Ill., 200 tons, lithographing plant, J. L. Clark Mfg. Co.

Lombard, Ill., 500 tons, grade separation bridge.

Elmhurst, Ill., 400 tons, grade separation bridge.

Clinton, Iowa, 3300 tons, Mississippi River dam No. 13.

Villa Park, Ill., 250 tons, overhead crossing.

Kenosha, Wis., 135 tons, Wilmot bridge over Fox River; bids Dec. 10.

Minot, N. D., 800 tons, bridge.

St. Louis, 250 tons, Vandeventer Avenue viaduct; Webb-Boone Paving Co. and Chase Construction Co., low bidders on general contract.

Kansas City, Kan., 900 tons, municipal power plant.

WESTERN STATES

Twin Falls, Idaho, 1000 tons, reservoir.

Hardin, Mont., 800 tons, building for Holly Sugar Corp.

Oakland, Cal., 825 tons, warehouse.

Los Angeles, 700 tons, warehouse.

FABRICATED PLATES

AWARDS

Pittsburgh, 4000 tons, 25 coal barges for Vesta Coal Co., to Jones & Laughlin Steel Corp.

Long Beach, Cal., 351 tons, seamless steel pipe, to California Pipe & Supply Co.

NEW PROJECTS

Richmond Water & Gas Corp., Richmond, Ky., standpipe, about 500,000-gal. capacity.

SHEET PILING

NEW PROJECTS

Clinton, Iowa, 2300 tons, Mississippi River dam No. 13; bids Jan. 5 by United States Engineer's Office, Rock Island, Ill.

The Baby Cupola

(CONCLUDED FROM PAGE 49)

Melting by these equipments, provided operations are carefully controlled, results in little alteration to the metal. Invariably the carbon alteration, which is about three per cent in the mix, remains about this value only when the ingots are cupola melted. With the other melting plants varying carbon losses are noted, it being possible to lower the total carbon to two per cent. The "life" of the metal then becomes much lower, in order to allow the successful running of the thinnest castings.

The cupola is therefore of interest in this case because austenitic is quite separate from ordinary irons, and special melts are necessary as a result. This is possible, under the best technical and economic conditions, if there is at hand a cupola conforming to the output envisaged, which in most cases involves small quantities only.

The use of a baby cupola is therefore particularly appropriate; it provides a means of securing practically perfect results as the following analysis of Ni-Resist ingots remelted in one of these cupolas shows: 2.92 total carbon, 2.25 silicon, 1.46 manganese, 0.020 sulphur, 0.062 phosphorus, 12.20 nickel, 6.14 copper, and 1.90 chromium.

The same raw iron remelted in the crucible with the re-use of runners, etc., gives carbon contents of the order of 2.0 to 2.1 per cent, the remainder of the composition being much the equivalent.

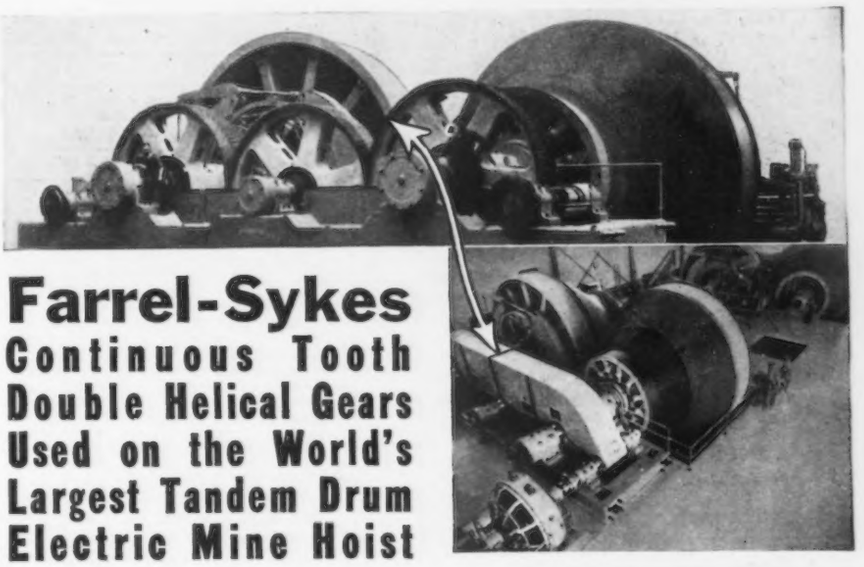
Therefore, in conclusion, it may be stated that the melting of small quantities of high-quality irons can be advantageously carried out in the baby cupola (about 15.7 in. internal diameter). The raw material used must be of one type, homogeneous, of exact composition and properties. Provided the plant has been well built (by a specialist or the founder himself) and is well run, the fabrication of these irons will be speedy, economic, and their quality will be improved compared with the same irons melted in the full-sized cupolas.

Cast Iron Pipe Employment Rises

BOTH employment and production by manufacturers of cast iron pipe and fittings showed pronounced increases in 1935 as compared with 1933, according to preliminary figures compiled from returns of the biennial census of manufactures taken this year, released this week by the Department of Commerce.

The number of wage earners reported for 1935, 13,543, represents an increase of 43.3 per cent, compared with 9454 for 1933, the last preceding census year; the total wage payments increased 77.4 per cent, from $5,847,187 to $10,370,393; and the total value of cast iron pipe and fittings made in this industry in 1935 amounted to $34,733,761, exceeding the 1933 figure, $18,640,192, by 86.3 per cent.

In addition, cast iron pipe and fittings are made to some extent as secondary products by establishments engaged primarily in other lines of manufacture. The value of this production (principally pipe fittings) made outside the industry in 1933 amounted to $3,993,046. The corresponding figure for 1935 is not available at this time, but will be given in the final report of the current census.



Farrel-Sykes
Continuous Tooth Double Helical Gears Used on the World's Largest Tandem Drum Electric Mine Hoist

The mine hoist illustrated above is a typical example of the use of Farrel-Sykes Gears in a critical service where failure cannot be risked.

This hoist, which is the largest of its type in the world, was built by the Nordberg Manufacturing Co. for the Homestake gold mine at Lead, in the Black Hills of South Dakota. The complete hoist weighs 500 tons and each drum 105 tons. Each drum will wind over a mile of 1⅞" diameter steel wire rope. The hoist is operated by two 1500 H. P. motors running at 300 R.P.M. This speed is reduced by the Farrel-Sykes Gears to 35 R.P.M. for the drums.

Where absolute reliability and unfailing performance are paramount Farrel-Sykes Continuous Tooth Herringbone Gears are the logical choice. They have the "backbone" for heavy duty service; the continuous teeth give them extra strength and durability, and the accuracy of generation by the famous Sykes process makes them smooth-running, efficient and economical.

Farrel engineers are available for consultation on gear applications. Their experience in solving many unusual drive problems may help with yours.

FARREL-BIRMINGHAM COMPANY, INC.
333 Vulcan St., Buffalo, N. Y.

FARREL-SYKES *"The Gear With a Backbone"*

Feeds and Speeds For Milling*

THE feeds and speeds given in the accompanying table are based on the use of high-speed steel tools. They represent good practice under average shop conditions and with present-day equipment. There being no comprehensive scientific data available, some of the figures given are necessarily empirical. It is believed, however, that the table in its present form will fill a long felt need for a simple data sheet for determining milling feeds and speeds.

The table is based on the cutting of S.A.E. 1020 steel. When some other material is to be cut the figures in the table must be corrected as indicated below.

To illustrate with an actual example, let us assume that we are to mill ½ in. deep and 1¼ in. wide in alloy steel of medium grade of machineability:

Reading to the right from ½ in. depth in the table and down from 1¼ in. width we find:

Feed = 3.5 in. per min.

Speed = 95 surface ft. per min.

The correction factor for medium machining alloy steel = 0.65

Multiplying 3.5 by 0.65 we have 2.275

Multiplying 95 by 0.65 we have 61.75

The indicated feed and speed for this case then are:

Feed = 2.275 in. per min.

Speed = 61.75 ft. per min.

*Data by courtesy of National Twist Drill Co.

FEEDS AND SPEEDS FOR MILLING (Average Conditions)

DEPTH OF CUT IN INCHES.		WIDTH OF CUT IN INCHES															
		¼	½	¾	1	1¼	1½	2	2½	3	4	5	6	7	8	10	12
¼	Feed	4.5	4.5	4	4	4	3.5	3.5	3.5	3	3	3	2.5	2.5	2.5	2.25	2.25
	Speed	110	110	105	105	100	100	100	95	95	95	90	90	90	85	85	85
½	Feed	4.5	4	4	4	3.5	3.5	3.5	3	3	3	2.5	2.5	2.25	2.25	2	2
	Speed	105	105	100	100	95	95	95	90	90	90	85	85	85	80	80	80
¾	Feed	4	4	3.5	3.5	3.5	3	3	3	2.5	2.5	2.25	2.25	2	2	1.75	1.75
	Speed	100	100	95	95	90	90	90	85	85	85	80	80	80	75	75	75
1	Feed	4	3.5	3.5	3.5	3	3	3	2.5	2.5	2.25	2.25	2	2	1.75	1.5	
	Speed	95	95	90	90	85	85	85	80	80	80	75	75	75	70	70	
1¼	Feed	3.5	3.5	3.5	3	3	3	2.5	2.5	2.25	2	1.75	1.5	1.5	1.25		
	Speed	90	90	85	85	80	80	80	75	75	75	70	70	70	65		
1½	Feed	3.5	3.5	3	3	3	2.5	2.5	2.25	2	1.75	1.5	1.25	1			
	Speed	85	85	80	80	75	75	75	70	70	70	65	65	65			
2	Feed	3.5	3	3	3	2.5	2.5	2.25	2	1.75	1.5	1.25	1				
	Speed	80	80	75	75	70	70	70	65	65	65	60	60				
2½	Feed	3	3	2.5	2.5	2.25	2	1.75	1.5	1.25	1						
	Speed	80	75	75	70	70	65	65	65	60	60						
3	Feed	2.5	2.5	2.25	2	1.75	1.5	1.25	1								
	Speed	75	75	70	70	65	65	60	60								
4	Feed	2.5	2	1.75	1.5	1.25	1										
	Speed	75	70	70	65	65	60										
5	Feed	2	1.5	1.25	1												
	Speed	70	70	65	65												
6	Feed	1.75	1.5	1													
	Speed	70	65	65													

Feeds are given in Inches per Minute.
Speeds are given in Surface Feet per Minute.

To obtain the proper Feed and Speed for a given material, multiply both Feed and Speed figures given in table by the correction factor for that material.

Correction Factors

S.A.E. 1020	= 1.00
S.A.E. 1035—Annld.	= .80
Tool Steel—Annld.	= .60
Alloy Steels:	
Free Machining	= .80
Medium	= .65
Tough	= .50
Cast Steel	= .40
Cast Irons:	
Hard	= .70
Medium	= .95
Soft	= 1.20
Malleable Iron	= .80
Brass and Bronze:	
Free Machining	= 2.50
Medium	= 1.60
Hard	= .80
Monel Metal	= .70
Magnesium Alloys	= 5.00
Aluminum	= 2.00

Feeds and speeds for any other material, at any depth and width of cut, can be quickly computed by this method.

It should be emphasized here that the figures so obtained will not apply literally to every milling operation, because the rigidity of the machines and set-ups will vary. Thus, if the milling machine is new and substantial, the fixtures arbor and work piece rigid, the figures given may be considerably increased. Under adverse conditions, on the other hand, the figures may have to be reduced.

Steel Employees 5000 Up in October

NEARLY 5000 employees were added to the payrolls of the steel industry during October, bringing current employment to 531,400—more than 15 per cent above the 1929 level, the American Iron and Steel Institute reports.

In October, 1935, the industry had 436,600 employees, indicating a 22 per cent increase in employment during the year.

Payrolls of the industry in October totaled $71,110,000—almost $1,000,000 above the average monthly payrolls in 1929, and nearly $20,000,000 more than was paid out in October of last year.

Of the 531,400 employees at work in the industry during October, 480,800 were wage earners paid on an hourly, piecework or tonnage basis.

Hourly earnings of wage earners during the month averaged 66.3c. It is expected that the wage increase which went into effect generally throughout the industry on Nov. 16 will raise the average hourly earnings to about 73c.

During October, wage earners worked an average of 42.5 hr. per week, which compares with 40.5 hr. in September. In 1929 wage earners worked an average of 55 hr. per week.

The following table compares total employment and payrolls of the steel industry, and the average hourly earnings of wage earners, for the months of October and September, 1936. For comparison, October, 1935, is included in the table.

	Oct., 1936	Sept., 1936	Oct., 1935
Total Number of Employees	531,400	526,700	436,600
Total Payrolls	$71,100,000	$65,600,000	$51,500,000
Average Hourly Earnings of Wage Earners	66.3c.	66.3c.	65.5c.

Daily Steel Output in November Greatest Since September, 1929

THE daily output of steel ingots during November was greater than in any month since September, 1929, and was the highest for any November in the history of the industry, according to the American Iron and Steel Institute. Production averaged 173,496 gross tons of ingots per day during the month, an increase of 3 per cent over the October average of 168,333 gross tons, and 43 per cent above the average daily output in November, 1935, of 121,170 gross tons. Maximum average daily output in the record year 1929 was reached in June of that year when 196,118 gross tons were produced per day. The average daily output in September, 1929, which has not since been exceeded, was 181,115 gross tons.

Total tonnage produced during the month, 4,337,412 gross tons, fell short of the October total of 4,545,001 gross tons because November contained only 25 working days as against 27 in the preceding month. Output in November, 1935, totaled 3,150,409 gross tons. Operations during the month were equivalent to 79.05 per cent of the total capacity of the industry, which compares with 76.70 per cent in October and with 54.73 per cent in November of last year.

Total production of open hearth and Bessemer ingots in 11 months was 42,487,717 tons, indicating that the maintenance of the November rate through December, with its 26 working days, will raise the year's total to approximately 47,000,000 tons.

Jones & Laughlin Raises Pensions

PITTSBURGH, Dec. 8.—The Jones & Laughlin Steel Corp. last week notified pensioners that a 10 per cent reduction in effect during the depression has been terminated as of Dec. 1.

REPORTED BY COMPANIES WHICH IN 1935 MADE 98.03 PER CENT OF THE OPEN-HEARTH AND 100 PER CENT OF THE BESSEMER INGOT PRODUCTION

	Reported Production (Gross Tons)		Calculated Monthly Production All Companies		Number of Working Days	Per Cent of Operation
1934	Open-Hearth	Bessemer	Monthly	Daily		
January	1,786,458	172,489	1,997,129	73,968	27	33.59
February	1,993,465	175,873	2,211,944	92,164	24	41.86
March	2,540,243	203,904	2,798,440	103,646	27	47.07
April	2,622,531	257,482	2,936,064	117,443	25	53.34
May	3,003,676	331,620	3,399,494	125,907	27	57.18
June	2,718,782	282,592	3,059,483	117,672	26	53.44
July	1,340,924	119,869	1,489,453	59,578	25	27.06
August	1,245,139	109,598	1,381,350	51,161	27	23.24
September	1,127,269	117,615	1,268,977	50,759	25	23.05
October	1,325,777	127,789	1,481,902	54,885	27	24.93
November	1,447,626	132,059	1,610,625	61,947	26	28.13
December	1,794,437	131,467	1,964,257	78,570	25	35.68
Total	22,946,327	2,162,357	25,599,118	83,312	311	37.38
1935						
January	2,578,531	239,858	2,870,161	106,302	27	48.02
February	2,499,744	224,336	2,774,271	115,595	24	52.22
March	2,582,628	230,810	2,865,292	110,204	26	49.78
April	2,361,275	231,916	2,640,602	101,562	26	45.88
May	2,332,042	254,796	2,633,661	97,543	27	44.06
June	2,007,862	210,487	2,258,664	90,347	25	40.81
July	2,003,151	224,456	2,267,827	87,224	26	39.40
August	2,629,768	233,361	2,915,930	107,997	27	48.78
September	2,540,264	233,737	2,825,004	113,000	25	51.04
October	2,815,510	270,719	3,142,759	116,398	27	52.58
November	2,841,199	252,163	3,150,409	121,170	26	54.73
December	2,789,015	228,392	3,073,405	122,936	25	55.53
Total	29,980,989	2,835,031	33,417,985	107,453	311	48.54
1936						
January	2,793,421	196,389	3,045,946	112,813	27	51.40
February	2,707,562	202,445	2,964,418	118,577	25	54.03
March	3,095,375	185,040	3,342,619	128,562	26	58.58
April	3,565,821	304,775	3,942,254	151,625	26	69.09
May	3,670,401	302,092	4,046,253	155,625	26	70.91
June	3,578,044	334,897	3,984,845	153,263	26	69.83
July	3,525,281	326,606	3,922,731	150,874	26	68.74
August	3,768,832	350,560	4,195,130	161,351	26	73.52
September	3,782,056	303,048	4,161,108	160,043	26	72.92
October	4,144,013	317,710	4,545,001	168,333	27	76.70
November	3,928,904	329,553	4,337,412	173,496	25	79.05

. . . Sir William Firth predicts world steel record in 1937.

° ° °

. . . Output of steel is still increasing.

LONDON, Dec. 8 (By Cable)—The price increase on foundry and forge iron has been realized only on small tonnages, as producers are sold out up to the end of February and are refusing further business, although consumers are anxious to place orders up to the end of June. It is generally assumed that the rise in pig iron marks an upward movement in all grades of iron and steel. An early revision of the hematite prices is expected. Meanwhile a 10s. premium is being charged.

The output of steel is still increasing, but the pressure on deliveries remains unrelaxed. Producers of semi-finished steel are fully booked for months ahead and rollers of joists, sections and rails are working at full capacity. There are further inquiries for large tonnages for both home and export trade.

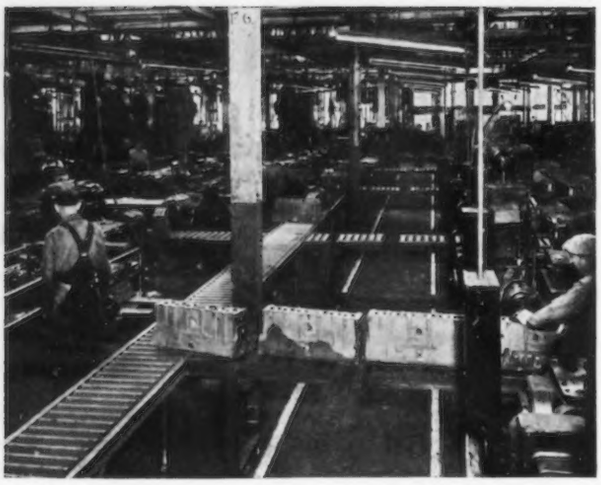
Barring war risks, Sir William Firth predicts for 1937: Increasing demand for steel, rising prices, less unemployment and record world production of iron and steel.

The clerical staffs of three large Scottish steelworks are striking because their employers refuse to recognize their union and 5000 steel workers are threatening a sympathy strike.

Home and export bookings of tin plate are very heavy, with unfilled orders at about 5,500,000 base boxes.

The Continental iron and steel market demand is active and plants are unable to accept orders for reasonably early delivery, as the International Steel Cartel is limiting December sales of merchant steel to 180,000 tons and sections to 50,000 tons.

Continental export prices have been raised by an average of 7s. 6d. gold per ton on semi-finished steel, sections, bars, plates, thick sheets, and billets. British prices remain unchanged.



Ask FOR "PROBLEMS SOLVED"

Familiarity with detail often obscures the general principle—we can't see the woods for the trees. In many plants there are overlooked opportunities for handling materials with the continuous flow principle, which the outside view-point of Mathews engineers can and will uncover. Clues which will enable you to discover such opportunities for yourself, by showing how the principle is used in other plants, are given in the Mathews book "Problems Solved"—gladly sent to executives.

MATHEWS CONVEYER COMPANY

San Francisco, Calif. **ELLWOOD CITY, PENNA.** Port Hope, Ont., Can.

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The Harrington & King PERFORATING Co.

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Materials Handling As a Factor in Economic Production

(CONTINUED FROM PAGE 39)

one end of the room to the other without a single bit of back-tracking. The total length of travel was reduced to 30 per cent of the former figure, by means of mechanical handling devices the labor effort was reduced 65 per cent, and a 15 per cent saving in production costs was effected.

Bottleneck Avoided by Skilful Arrangement

Fig. 2 illustrates a somewhat more complicated arrangement in a cylinder machining department of an automotive plant. Five separate lines of travel of materials and parts entering the department in the upper right hand part of the chart move progressively around to the left and down, converging gradually at the lower right hand corner of the chart to a single delivery line of completed parts. Throughout all the movements a large engine block, much too heavy for one man to handle, is moved easily along on roller conveyers from point to point, with conveyer turntables, turnover and lifting stands and special tilting devices introduced at strategic points to facilitate getting the block to and away from the various machines on which, in different positions which would otherwise have required a tremendous amount of manual handling, work is done.

Economical Production Assured

It is inconceivable that manual handling methods could possibly make this orderly and progressive flow of material from process to process proceed at a pace consistent either with fair costs or at a uniform rate of speed. Only the intelligent application of mechanical equipment makes it possible to operate this shop economically.

The next article in this series will treat in greater detail of the basic theories of materials handling systems, with particular reference to the economics involved. Later articles will present detailed descriptions of the types of equipment now available for use in systems of economical materials handling.

Merchant Iron Made, Daily Rate

Tons

	1936	1935	1934	1933	1932
January	10,537	3,926	7,800	2,602	6,256
February	11,296	6,288	7,071	2,863	7,251
March	10,831	7,089	7,197	2,412	1,157
April	13,897	8,799	8,838	1,908	5,287
May	12,814	8,441	9,099	3,129	4,658
June	14,209	7,874	9,499	4,088	6,090
July	11,619	8,644	7,880	6,783	3,329
August	12,148	8,194	6,043	7,756	3,070
September	12,526	10,090	4,986	10,034	3,213
October	13,645	11,199	5,765	8,634	4,286
November	14,739	12,503	6,610	7,639	4,435
December	.....	13,312	4,399	8,358	3,674

Daily Average Production of Coke Pig Iron

Gross Tons

	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	86,208	51,750	64,338	42,166	20,935
½ year	74,331	54,138	54,134	24,536	28,412
July	83,686	49,041	39,510	57,821	18,461
August	87,475	56,816	34,012	59,142	17,115
September	91,010	59,216	29,935	50,742	19,753
October	96,512	63,820	30,679	43,754	20,800
November	98,246	68,864	31,898	36,174	21,042
December	.....	67,950	33,149	38,131	17,615
Year	.....	67,556	43,592	26,199	23,733

November Pig Iron Output 2,947,365 Tons

ON the basis of complete returns from companies producing pig iron, actual production of coke pig iron in November was 2,947,365 gross tons, compared with 2,991,887 tons in October. The daily rate last month showed a gain of 1.8 per cent over that of October, or from 96,512 tons to 98,246 tons.

On Dec. 1, there were 164 furnaces making iron, operating at a rate of 99,205 tons, compared with 161 furnaces on Nov. 1, producing at the rate of 97,740 tons daily. Furnace changes as given in last week's issue, page 95, remained the same.

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1936	1935	1936	1935
January	2,025,885	1,477,336	24,766	10 048
February	1,823,706	1,608,552	24,988	12,288
March	2,040,311	1,770,028	22,725	17,762
April	2,403,683	1,663,475	19,667	18,302
May	2,648,401	1,727,095	18,363	17,541
June	2,586,240	1,552,514	17,549	12,961
½ year	13,528,226	9,799,000	128,058	88,902
July	2,594,268	1,520,263	20,205	13.175
August	2,711,721	1,761,286	20,658	12,735
September	2,730,293	1,776,476	15,919	15,983
October	2,991,887	1,978,411	19,805	19,007
November	2,947,365	2,065,913	24,368	18,245
December	.....	2,106,453	.....	17,126
Year	.....	21,007,802	.....	185,173

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) November (30 Days)	Production (Gross Tons) October (31 Days)	December 1 Number in Blast	December 1 Operating Rate, Tons a Day	November 1 Number in Blast	November 1 Operating Rate, Tons a Day
New York:						
Buffalo	211,730	205,758	12	7,060	12	6,795
Other New York and Mass.	28,391	33,068	1	175	3	1,065
Pennsylvania:						
Lehigh Valley	57,659	64,267	5	1,920	5	2,075
Schuylkill Valley	26,483	24,584	2	885	2	795
Susquehanna and Lebanon Valleys	17,824	20,807	1	595	1	670
Ferromanganese	.....	.....	0	....	0	....
Pittsburgh District	674,862	686,984	35	22,805	34	22,255
Ferro. and Spiegel	13,190	13,795	3	440	3	445
Shenango Valley	59,633	65,147	4	1,990	4	2,100
Western Pennsylvania	89,631	83,696	5	2,990	5	3,270
Ferro. and Spiegel	11,178	6,010	2	400	1	195
Maryland	118,034	123,913	5	3,935	5	3,995
Wheeling District	121,801	148,204	6	4,060	6	4,100
Ohio:						
Mahoning Valley	293,288	303,525	14	9,775	14	9,790
Central and Northern	272,195	282,315	14	9,070	15	9,345
Southern	49,136	52,454	4	1,640	4	1,690
Illinois and Indiana	568,840	577,786	26	19,445	25	18,640
Michigan and Minnesota	88,353	80,462	6	3,075	5	2,595
Colorado, Missouri and Utah	27,003	27,565	2	900	2	890
The South:						
Virginia	.....	.....	0	....	0	....
Kentucky	25,478	26,912	2	850	2	870
Alabama	192,656	164,635	15	7,195	13	6,160
Tennessee	.....	.....	0	....	0	....
Total	2,947,365	2,991,887	164	99,205	161	97,740

Bethlehem To Pay $1.50 on Common

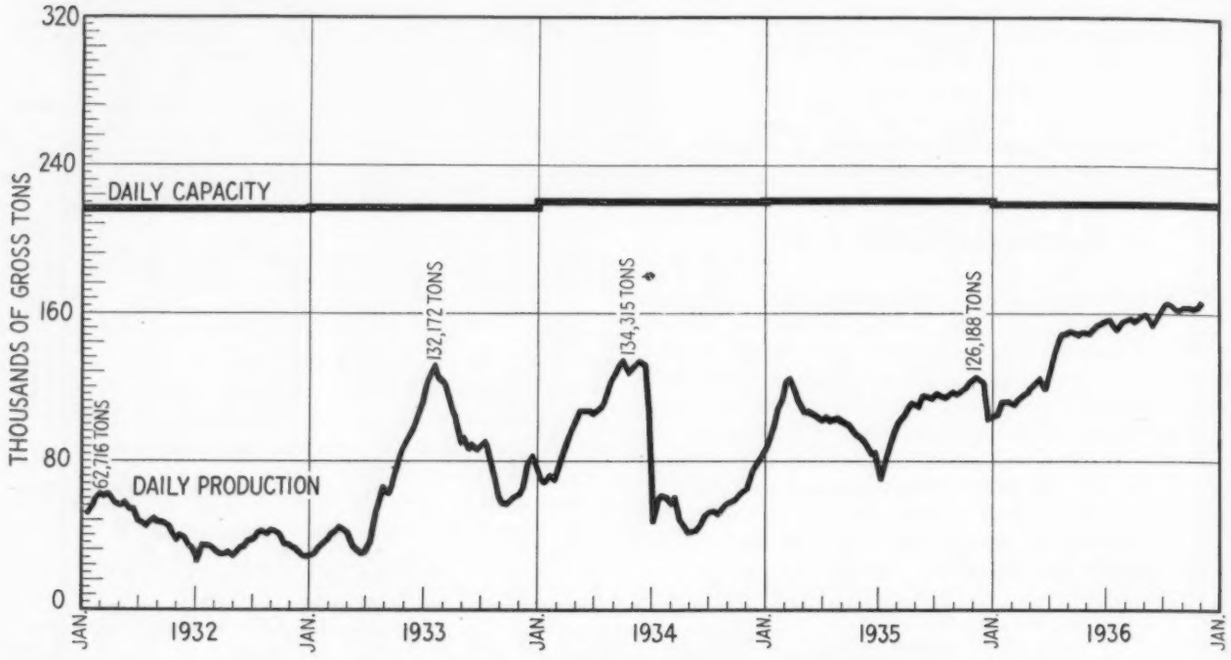
A DIVIDEND payment of $1.50 a common share was announced Tuesday by Eugene G. Grace, president, Bethlehem Steel Co. This dividend, the first since Oct., 1931, is payable Dec. 24, to stockholders of record Dec. 17. Emphasizing that this action was not brought about by a desire to escape excess profits taxes, Mr. Grace read a statement published long before any such means of taxation was being considered, which stated that common stockholders would be taken care of as soon as preferred arrearages were disposed of and earnings justified such a move. Mr. Grace believes that earnings this final quarter will more than take care of the $1.50 payment, $1.01 having been earned on the common already this year.

When questioned about the price increases, Mr. Grace said that, assuming the advances average about $3 per ton, they would "about compensate increased labor costs." In discussing the practice of mills allowing customers time to cover their needs at old prices before the higher quotations take effect, Mr. Grace termed this procedure a "poor policy," and said that it was unfair to the consuming public as well as to the producer, and that if some of the company's competition would abolish the practice, he would be willing to follow suit.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	Weeks Ended Dec. 14, 1935	Dec. 15, 1934	Dec. 16, 1933	Dec. 17, 1932
167,870	166,799	123,974	72,662	67,169	32,439



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended Nov. 14, 1936	Dec. 14, 1935	Dec. 15, 1934
Pittsburgh	75.0	72.0	70.0	44.0	21.0
Chicago	77.5	77.0	76.0	59.0	35.5
Valleys	78.0	78.0	75.0	62.0	37.0
Philadelphia	54.5	54.5	55.0	39.0	25.0
Cleveland	76.0	76.0	84.0	84.0	50.0
Buffalo	84.0	84.0	84.0	42.0	19.0
Wheeling	94.0	94.0	93.0	78.0	70.0
Southern	69.5	69.5	69.5	50.0	33.0
Ohio River	91.0	95.0	95.0	82.0	50.0
Western	59.0	59.0	59.0	40.0	15.0
St. Louis	69.0	69.0	69.0	64.0	25.0
Detroit	100.0	100.0	100.0	95.0	57.0
Eastern	85.0	85.0	85.0	40.0	30.0
Aggregate	76.5	76.0	74.5	56.0	33.0
Average Year to Date	66.4	66.3	65.9	48.1	37.2

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended Dec. 8, 1936	Dec. 1, 1936	Nov. 10, 1936	Dec. 10, 1935	Year to Date 1936	1935
Fabricated structural steel awards	14,600	25,210	26,000	18,000	987,605	746,515
Fabricated plate awards	4,350	415	230	2,720	199,015	139,270
Steel sheet piling awards	0	1,195	1,865	0	53,960	63,525
Reinforcing bar awards	2,965	4,200	4,450	4,000	317,805	294,790
Total Lettings of Construction Steel	21,915	31,020	32,545	24,720	1,558,385	1,244,100

. . . SUMMARY OF THE WEEK. . . .

. . . Unfilled tonnages, heaviest since 1929, force ingot output higher.

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. . . Further orders expected from building projects and railroad equipment.

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. . . Operations probably will continue at about present rate through first quarter.

WITH the heaviest unfilled tonnages on their books since 1929, and orders still pouring in except in those products for which books have been closed at fourth quarter prices, steel companies are exerting all pressure to complete shipments of these orders by Jan. 31 so that they realize at the earliest possible moment the higher prices announced for first quarter. Bookings are largest in sheets, strip, wire products, bars, rails and track accessories and lightest in plates, shapes and pipe, but these last-named products will benefit later on from the considerable volume of railroad equipment orders and building construction work that is now being rushed to the contract stage in order to escape the price advances.

Mills have announced that on identified construction projects, including railroad equipment, they will protect contractors at fourth quarter prices on all jobs quoted on by Dec. 31, with the understanding that binding steel contracts shall be entered into by Jan. 31 and that specifications shall be in by March 31, with rolling and shipment at mill convenience. This concession to the construction field has revived many inactive projects and will hasten others that have been lagging. As an example, one steel company has given price protection on 17 oil refineries. Much of such business will not be rolled until the second quarter.

Recent railroad buying, which mills estimate at 900,000 tons of rails and about 270,000 tons of track accessories, will contribute in large measure to the support of steel production in the first quarter, as shipments will not be completed until March 31, and may go beyond that date because of inability of mills to get out the tonnage.

ALTHOUGH a leading steel producer has announced that all orders at the old prices not shipped by Jan. 31 will be billed at the higher prices, it is said to be physically impossible for some mills to get out by that time all of the sheets they have booked. Some steel mills have returned to their customers sheet orders tendered at the old prices which they could not complete by Jan. 31, and in some instances these have been sent back by the buyers with permission to bill at the new prices. The actual refusal of orders by the mills is almost unprecedented. The record-breaking volume of business booked by the mills is illustrated by the fact that an important district office of a large company entered more tonnage in November than in all of 1932.

STEEL ingot production this week is estimated at 76½ per cent, but is possibly higher in view of the fact that actual output in November, at 79.05 per cent, was several points above highest weekly estimates, indicating that tonnage records are being made at several plants. The November daily output of ingots, at 173,496 gross tons, was the highest for any November in the industry's history and was only 13 per cent below the all-time peak month, June, 1929, when the daily average was 196,118 tons, and was only 1143 tons a day below the average for the full year 1929. Total output for 11 months this year was 42,487,-717 tons, and the outlook for December clearly indicates that a 47,000,000-ton total will be recorded for 1936.

It can be definitely predicted that steel plant operations at the present rate or higher will continue at least through January and probably through the entire first quarter. Increased output at some plants will be prevented only by shortages of scrap, pig iron, coke or raw steel, some companies feeling the pinch of insufficient blast furnace and open-hearth capacity. Pig iron shipments to the foundry trade this month will be the largest of the year, and a further rise in pig iron prices in the first quarter is not improbable. Meanwhile, furnaces that sell in New England are now quoting the $1.25 higher prices recently announced by the Mystic furnace at Everett, Mass., and Indian iron has also been advanced the same amount. The continued shortage of coke has brought an advance of 10c. a ton in the beehive grade.

Additional price advances of the past week include a $5 a ton increase in cold-rolled strip, except commodity grades and lamp stock, which are up $4; cold-finished alloy bars, $4; rail steel mer-

chant bars, $3; skelp, $2 (by one producer); car axles, $5 a ton; freight car wheels, $1 each; passenger and locomotive tender wheels, $2 each; trolley wheels, about 5 per cent; bolts and nuts, about 10 per cent; large rivets, $4; cast iron pipe, $2 a ton; silvery pig iron and Bessemer ferrosilicon, $1.25 a ton; fluorspar, $1 a ton. Producers of pipe have opened their books for first quarter at unchanged prices. Pipe, tin plate and reinforcing bars are the only important products on which no price increases have been announced.

RAILROAD equipment buying is still a market feature. Southern Pacific has ordered 3000 freight cars and will rebuild 1750 in its own shops; Seaboard Air Line has bought 1000 cars; Reading, 425; Montour Railroad, 500; Western Pacific, 100, and Western Maryland, 100. The Great Northern will buy 2000 cars; the Missouri-Kansas-Texas has a car building program, details of which have not been announced; the Milwaukee Road will build 500 additional, and the Chesapeake & Ohio is inquiring for 135. The Denver & Rio Grande Western ordered 15 locomotives and the Seaboard Air Line, five, while the Southern Pacific is in the market for 20. Belated rail orders totaled more than 70,000 tons, including 15,000 tons, with accessories, for the Wabash, 12,640 tons for the Denver & Rio Grande Western, and a number of smaller lots.

With the settlement of the strike at the plant of the Midland Steel Products Co., the immediate threat to automobile production is removed, but a shortage of glass, owing to labor troubles, still looms as a possibility. Meanwhile, car output has recovered lost ground and retail sales are breaking records for this time of year.

Structural steel lettings will tend to go higher because of the price situation, although this is normally an off season. Pending projects call for upward of 30,000 tons. Republic Steel Corp. has taken bids on 14,000 tons for a mill building at Cleveland.

The Humble Oil & Refining Co. has ordered 12,000 tons of pipe from National Tube Co. for a pipe line.

THE steel scrap market reflects the stronger tone in the steel industry. Advances of 50c. a ton have occurred at Pittsburgh and Philadelphia, bringing THE IRON AGE composite price up to $16.50, within 25c. of its peak for the year. With the withdrawal of strip makers from the market at fourth quarter prices, the new prices are in full effect, resulting in an increase in THE IRON AGE finished steel composite price to 2.274c. a lb. The pig iron composite price is unchanged.

RAILROAD BUYING

Denver & Rio Grande Western has ordered 15 locomotives from Baldwin Locomotive Works.

Seaboard Air Line has purchased five locomotives from Baldwin Locomotive Works and 1000 box cars from Pullman-Standard Car Mfg. Co.

Aluminum Co. of America has bought one diesel-electric locomotive from American Locomotive Co.

Montour Railroad has ordered 500 hopper cars from Pullman-Standard Car Mfg. Co.

Western Pacific has purchased 100 all-steel Hart selective ballast cars from American Car & Foundry Co.

Chesapeake & Ohio is inquiring for 10 horse express cars, 25 dry bulk cars, 50 stock and 50 caboose cars.

Missouri-Kansas-Texas is considering a car building program, details of which have not been decided upon definitely.

Southern Pacific has ordered 2000 refrigerator cars and 1000 box cars, and will rebuild 1750 additional cars, for the Pacific Fruit Express Co., owned jointly by Union Pacific and Southern Pacific. It is also considering buying 20 locomotives. The refrigerator purchase was divided evenly among General American Car Co., American Car & Foundry Co., Pullman-Standard Car Mfg. Co., and Pacific Car & Foundry Co. The box cars were evenly divided among American Car & Foundry Co., Pullman-Standard Car Mfg. Co., Pressed Steel Car Co., and Bethlehem Steel Co. Rebuilding program will be carried out in the Pacific Fruit Express Co.'s shops.

Baltimore & Ohio has ordered 22 motor coaches from White Motor Co., Cleveland, for delivery Dec. 15, to replace those in service between B. & O. Jersey City terminal and its 14 stations in New York City and vicinity.

Reading is building 25 steel cabooses and 400 freight cars.

Western Maryland has ordered 100 steel automobile box cars from Bethlehem Steel Co.

Great Northern will buy 2000 cars.

Santa Fe has put into service a new light-weight passenger coach constructed of Cor-Ten steel. Its weight is 98,000 lb. as against 160,000 lb. for standard coaches. This car has dimensions of a standard 80-passenger coach but seats only 52, the remainder of space being used for lounging rooms.

Milwaukee may build 500 cars in addition to those now under construction in Milwaukee shops.

Edward G. Budd Mfg. Co. has placed an order with Timken Roller Bearing Co. for Timken bearings and boxes to equip all journals of six new light-weight streamlined trains which it will build for Rock Island Lines.

Chicago, Burlington & Quincy has placed an order with Timken Roller Bearing Co. for Timken bearings and boxes to equip all axles, including driving axles, of 10 new type 4-8-4 locomotives, which it will build in its own shops.

Wheeling & Lake Erie has specified Timken bearings and boxes on all axles, including driving axles, of 10 new type 2-8-4 locomotives ordered from American Locomotive Co.

Rock Island has placed an order for Timken bearings and boxes to equip all axles, including driving axles, of two existing steam locomotives and tenders.

RAILS AND TRACK SUPPLIES

Kansas, Oklahoma & Gulf has ordered 7000 tons of rails.

Chicago & Eastern Illinois has divided 7000 tons between Carnegie-Illinois Steel Corp. and Inland Steel Co.

Wabash has ordered 15,000 tons of rails and necessary accessories.

Reading has ordered 5000 tons of rails from Bethlehem Steel Co.

Central of New Jersey has placed an order for 2000 tons of rails with Bethlehem Steel Co.

Atlantic Coast Line has ordered 10,000 tons of 100-lb. rails.

Nashville, Chattanooga & St. Louis has ordered 6075 tons of rails from Tennessee Coal, Iron & Railroad Co.

Kansas City Southern has ordered 6000 tons of rails from Carnegie-Illinois Steel Corp. and 2000 tons from Inland Steel Co.

Denver & Rio Grande Western has ordered 12,640 tons of 131-lb. rails from Colorado Fuel & Iron Co.

Wheeling & Lake Erie has ordered 2000 tons from Carnegie-Illinois Steel Corp.

REINFORCING STEEL

. . . Awards of 2965 tons —1305 tons in new projects.

AWARDS

Boston, 350 tons, Liberty Mutual Insurance Co. building, to Jones & Laughlin Steel Corp.

Chicago, 800 tons, Calumet sewer for Sanitary District divided between two unnamed fabricators.

Chicago, 800 tons, second section Jane Addams housing project, to Inland Steel Co.

Daly City, Cal., 118 tons, school buildings, to Concrete Engineering Co.

Selby, Cal., 220 tons, stack and foundation for American Smelting Co., to Concrete Engineering Co.

Denver, 493 tons, railroad overpass, to Colorado Builders Supply Co.

Los Angeles, 179 tons, San Pedro high school, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Dartmouth-Westport, Mass., 112 tons, State bridge.

Benton Harbor, Mich., 400 tons, building for House of David.

Chicago, 1100 tons, 22 public school buildings.

Clinton, Iowa, 610 tons, dam across Mississippi River.

Reno, Nev., 180 tons, two city bridges; bids soon.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Dec. 8, 1936	Dec. 1, 1936	Nov. 10, 1936	Dec. 10, 1935
Rails, heavy, at mill	$39.00	$39.00	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	32.00	32.00	32.00	29.00
Sheet bars, Pittsburgh	32.00	32.00	32.00	30.00
Slabs, Pittsburgh	32.00	32.00	32.00	29.00
Forging billets, Pittsburgh	39.00	39.00	39.00	35.00
Wire rods, Nos. 4 and 5, P'gh	43.00	43.00	40.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.05	2.05	2.05	1.85
Bars, Chicago	2.10	2.10	2.10	1.90
Bars, Cleveland	2.10	2.10	2.10	1.90
Bars, New York	2.40	2.40	2.40	2.20
Plates, Pittsburgh	1.90	1.90	1.90	1.80
Plates, Chicago	1.95	1.95	1.95	1.85
Plates, New York	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.80
Structural shapes, Chicago	1.95	1.95	1.95	1.85
Structural shapes, New York	2.16¼	2.16¼	2.16¼	2.06¼
Cold-finished bars, P'gh	2.35	2.35	2.35	1.95
Hot-rolled strip, Pittsburgh	**2.15**	1.95	1.95	1.85
Cold-rolled strip, Pittsburgh	**2.85**	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.80	2.80	2.60	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.90	2.90	2.70	2.50
Sheets, galv., No. 24, P'gh	3.40	3.40	3.20	3.10
Sheets, galv., No. 24, Gary	3.50	3.50	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh	2.15	2.15	1.95	1.85
Hot-rolled sheets, No. 10, Gary	2.25	2.25	2.05	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.25	3.25	3.05	2.95
Cold-rolled sheets, No. 20, Gary	3.35	3.35	3.15	3.05
Wire nails, Pittsburgh	2.25	2.25	2.05	2.40
Wire nails, Chicago dist. mill	2.30	2.30	2.10	2.45
Plain wire, Pittsburgh	2.60	2.60	2.50	2.30
Plain wire, Chicago dist. mill	2.65	2.65	2.55	2.35
Barbed wire, galv., Pittsburgh	2.70	2.70	2.55	2.80
Barbed wire, galv., Chicago dist. mill	2.75	2.75	2.60	2.85
Tin plate, 100-lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Dec. 8, 1936	Dec. 1, 1936	Nov. 10, 1936	Dec. 10, 1935
No. 2 fdy., Philadelphia	$22.3132	$22.3132	$21.3132	$21.3132
No. 2, Valley furnace	20.50	20.50	19.50	19.50
No. 2, Southern Cin'ti	20.44	20.44	19.44	20.2007
No. 2, Birmingham†	16.88	16.88	15.88	15.50
No. 2, foundry, Chicago*	20.50	20.50	19.50	19.50
Basic, del'd eastern Pa.	21.8132	21.8132	20.8132	20.8132
Basic, Valley furnace	20.00	20.00	19.00	19.00
Malleable, Chicago*	20.50	20.50	19.50	19.50
Malleable, Valley	20.50	20.50	19.50	19.50
L. S. charcoal, Chicago	26.2528	26.2528	25.7528	25.2528
Ferromanganese, seab'd, carlots	**80.00**	75.00	75.00	85.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	**$17.75**	$17.25	$17.25	$14.25
Heavy melting steel, Phila.	**15.25**	14.75	15.25	12.50
Heavy melting steel, Ch'go.	16.50	16.50	16.50	13.50
Carwheels, Chicago	17.00	17.00	16.50	13.25
Carwheels, Philadelphia	16.75	16.75	16.75	13.00
No. 1 cast, Pittsburgh	**16.75**	16.25	16.25	14.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	13.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.00	11.75
No. 1 RR. wrot., Phila.	15.75	15.75	15.75	12.25
No. 1 RR. wrot., Ch'go (net)	14.25	14.25	14.25	11.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	**$3.85**	$3.75	$3.75	$3.60
Foundry coke, prompt	4.25	4.25	4.25	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	10.50	10.50	10.50	9.00
Lake copper, New York	10.62½	10.62½	10.62½	9.37½
Tin (Straits), New York	**51.62½**	51.37½	54.00	50.25
Zinc, East St. Louis	5.05	5.05	4.95	4.85
Zinc, New York	5.42½	5.42½	5.32½	5.22½
Lead, St. Louis	5.05	5.05	4.95	4.35
Lead, New York	5.20	5.20	5.10	4.50
Antimony (Asiatic), N. Y.	**12.62½**	12.50	12.50	14.75

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Dec. 8, 1936	2.274c. a Lb.	$19.73 a Gross Ton	$16.50 a Gross Ton
One week ago	2.249c.	19.73	16.17
One month ago	2.197c.	18.73	16.33
One year ago	2.130c.	18.84	13.42

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1936	2.274c., Dec. 8	2.084c., Mar 10	$19.73, Nov. 24	$18.73, Aug. 11	$16.75, Sept. 22	$12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

. . . PITTSBURGH . . .

. . . Ingot output at Pittsburgh up three points to 75 per cent of capacity.

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. . . Heavy backlogs assure present rate through January, possibly later.

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. . . Further price advances announced; steel scrap and beehive coke higher.

PITTSBURGH, Dec. 8.—Steel ingot output has spurted upward three points to 75 per cent of capacity as producers begin the tremendous task of getting out fourth quarter price tonnages. There is no doubt that steel operations in this district will continue at the present rate or better beyond the end of the year. Ingot production in the Wheeling district remains unchanged at 94 per cent of capacity.

Orders for sheets and strip steel booked within the past two weeks have been greater than at any time since 1929. With the announcement by the leading interest that all steel purchased at fourth quarter quotations must clear the mills by Jan. 31, or be billed at the new high prices, it is evident that finishing mill operations will be at practical capacity during the remainder of this year and all of January. Meanwhile, orders for those items such as bars, plates and shapes, in which producers can still accommodate tonnages in their rolling schedules, are literally pouring in. Total specifications booked so far this month show figures far in excess of the same period in November. The greatest portion of these orders is in anticipation of the higher first quarter prices and, as a result, bookings at the new quotations will probably be light for some time. However, it is noted that in the majority of cases, specifications for certain sizes and grades have been given, indicating that, although the purchasing is for forward uses, customers have a clear idea regarding their future requirements. Coupled with this advance buying is also a large percentage that is for immediate consumption.

Advances of $4 a ton on cold-rolled strip have been withdrawn and a $5 advance for first quarter delivery has been announced by several producers, cold-finished alloy bars have been advanced $4 a ton for first quarter delivery, and one maker of rail steel bars has advanced its quotations $3 a ton, effective Jan. 1. Car axles are up $5 a ton, making the new f. o. b. price 3.15c. a lb. Makers of railroad wheels for first quarter delivery have announced an advance of $1 each on freight car wheels, $2 each on passenger car and locomotive tender wheels and about 5 per cent on trolley wheels and miscellaneous sections.

Producers of pipe have opened their books for first quarter delivery with a reaffirmation of fourth quarter quotations. Although one Chicago maker has announced an advance of $2 a ton on skelp, producers in this district have as yet come to no decision on this item.

The pipe market was enlivened by a 12,000 ton order of 10-in. pipe for the Humble Oil & Refining Co. at Houston, Tex.

The scrap market has shown further strength, with an increase of 50c. a ton on No. 1 heavy melting. Beehive furnace coke has also advanced 10c. a ton and increases are in order for refractory material ranging $3 and more, which will be effective Jan. 1.

Pig Iron

Some producers in this district have opened their books for the

• Cleveland Cap Screws, made by the Kaufman Process, *patented,* are as good as they look, and they look like finely finished machined parts. Full finished, all over. Shanks are smooth, washer faces flat, tops shaved and flats burnished. Threads produced by the Kaufman Process are exceptionally strong and held to a Class 3 fit. Uniformly adequate tensile strength is maintained in excess of ordinary demand. From point to head a Cleveland Cap Screw impresses you as a product of finest quality, and so it is. Specify them from your jobber or our factory. THE CLEVELAND CAP SCREW CO., 2929 East 79th Street, Cleveland, Ohio.

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first quarter and are accepting orders at current prices. New business is light, but production and shipment are at an exceptionally high rate. The leading steel interest has blown in an additional blast furnace at its Edgar Thomson works.

Semi-Finished Steel

Specifications for semi-finished material showed a further spurt in the past week as consumers rushed to get protection against higher first quarter quotations. Some mills are unable to place as much tonnage on their books as their customers would like, owing to their own finishing mill requirements. On the other hand, those steel producers whose rolling schedules still permit the placing of additional semi-finished tonnage expect substantial increases in bookings before the end of the month. A heavy movement of sheet bars to non-integrated mills is now in progress. The latter are stocking as much steel as possible in order to gain the advantage of fourth quarter prices on raw material.

Bolts, Nuts and Rivets

Leading bolt and nut makers have announced new prices effective immediately for delivery through remainder of the year and first quarter of 1937. Those customers having contracts will be able to specify at fourth quarter quotations through to the end of the year. Discounts on bolts and nuts have been reduced and reflect an average increase of about 10 per cent in net prices. Large rivets have been advanced $4 a ton, the new price being 3.25c. a lb. base, f.o.b. Pittsburgh and Cleveland, and 3.35c. a lb. base, f.o.b. Chicago and Birmingham. The price on small rivets remains unchanged at this time. In anticipation of these higher prices, demand has been increasing, and in the past week a further improvement in specifications has been noted. The heavy volume of railroad purchasing assures good operations during the remainder of the year and into the first quarter.

Bars

Following the announcements of higher quotations, specifications for hot rolled bars started to march upward. Substantial increases in bookings have taken place daily within the past week. The leading producer has announced that all business taken at fourth quarter prices must be shipped by the end of December or as soon thereafter as possible. In any event, material must leave the mills by Jan. 31, or be billed at the new prices. This statement may be taken as reflecting the intention of producers to hew closer to deadlines on shipment than heretofore. Practically all consumers of hot rolled bars are specifying freely and in quite a few cases the new business constitutes forward buying in order to offset higher prices. Specifications for alloy bars are pouring in and total bookings in November were far ahead of those placed in October. A maker of rail steel bars has announced a $3 a ton increase, effective Jan. 1, 1937.

Cold-Finished Bars

Leading producers have announced an advance of $4 a ton on cold-finished alloy bars for first quarter delivery. Specifications placed in the past week have shown a substantial increase when compared with the previous period. Automobile manufacturers are ordering heavily and implement and tractor makers are showing no disposition to cut down on their large volume of bookings. Considerable anticipatory tonnage is being ordered by jobbers. While a large portion of the new business undoubtedly represents forward buying, because of price increases, the material for the most part is for known requirements.

Reinforcing Steel

A producer of rail steel reinforcing bars has announced a $3 a ton advance effective Jan. 1, which will bring the price to 2.05c. a lb., f.o.b. Pittsburgh. First quarter quotations on billet steel reinforcing bars have not yet been announced, although the opinion prevails that an increase is in prospect.

Rails and Track Accessories

Railroad cut spikes have been advanced $3 a ton to 2.90c. a lb. Customers are awaiting an announcement on light rail prices for first quarter delivery.

Strip

Volume of orders booked in the past week has been exceptionally heavy. Most producers in this district have booked all the tonnage they can ship by the end of January and are out of the market at fourth quarter prices. Those mills which have some room left on their rolling mill schedules will be filled up before the week is out. Automobile companies have been the largest buyers, but miscellaneous sources have specified heavily. The largest portion of this new business is forward buying to escape the higher prices recently announced. Leading producers of cold-rolled strip in this district have announced a price advance of $5 a ton on first quarter shipments. It is understood that the announcements of a $4 increase have been withdrawn.

Tin Plate

General line can specifications are being received in fair volume. Although producers are not taking orders for tin mill black plate at the old prices, considerable forward buying was in evidence during the past several weeks. As a result of these factors, tin plate operations remain at 89 per cent and no change is expected for the next two or three weeks at least.

Shapes and Plates

Demand for plates and shapes has picked up considerably in the past week and construction departments are literally swamped with inquiries representing contemplated projects. The heavy volume of railroad buying will create good sized backlogs at producers plants and it is expected that before the year is out unfilled orders for plates and shapes will assume large proportions. The American Bridge Co. will fabricate 2000 tons of plates and shapes for an office building for the Liberty Mutual Insurance Co., Boston. The contract for buildings at the Youngstown Sheet & Tube Co., involving 2300 tons, went to the Fort Pitt Bridge Works. Jones & Laughlin Steel Corp. will fabricate 25 steel standard coal barges for the Vesta Coal Co., one of their subsidiaries. Approximately 4000 tons of plates and shapes are involved in the order.

Sheets

Volume of sheet specifications placed in the past two weeks has been the largest since pre-depression periods. Mills are booked solid and considerable difficulty is expected in scheduling the heavy tonnages booked. Producers have made known to the trade that all fourth quarter price tonnage must leave the mills by Jan. 31 or be billed at the new prices. This attitude on the part of producers means that rolling mills will be operating at a high rate during the next two months. An interesting feature concerning the orders placed is that all are in the form of specifications for certain grades and sizes, indicating that customers have a good knowledge of their future requirements. This method of buying is in contrast to the one in vogue several years ago when blanket contracts were placed without any mention of sizes or grades.

Steel Sheet Piling

Awards have been light during the past week. Morrison, Glasscock & Connor, Kansas City, Mo.,

are the low bidders on a levee wall project at Munroe, La., involving 1200 tons of steel sheet piling. United States Engineers office at Rock Island, Ill., will take bids on Jan. 5, 1937 for 2200 tons of piling to be used on Mississippi River dam No. 13.

Tubular Products

Leading pipe producers have opened their books for first quarter shipment and have reaffirmed fourth quarter prices. National Tube Co. received an award for 120-mile line pipe from the Humble Oil & Refining Co., Houston, Tex. About 12,000 tons of 10-in. pipe will be fabricated. It is understood the finished pipe line will be used in the transportation of gas. Specifications for oil country goods are flowing in freely and no change has been noted in the steady demand for standard pipe. The large number of locomotive awards and inquiries indicate a brisk activity in railroad boiler tubes.

Wire Products

Mills are engaged in getting out a heavy volume of orders booked previous to the price increase. Practically all large customers were able to anticipate their needs to some extent before Dec. 1. Orders at the new prices have been negligible and no fair test is expected for some time, owing to heavy mill backlogs.

Coal and Coke

Coal production is on a par with levels established in 1929. Large industrial consumers are attempting to stock as much as possible. Orders for domestic beehive coke are in better volume this week following colder weather, and demand is emanating from both the West and the East. In anticipation of loss of production owing to holidays this month, some steel companies are placing fill-in orders so as not to be caught short. Beehive furnace coke is still not too plentiful and with none available at $3.75 a ton, the lower range of the price quotation has moved up 10c., making the spread from $3.85 to $4 a ton, prompt, f.o.b. Connellsville.

Warehouse Business

Local steel warehouses have moved up prices on wire and nails coincident with the advance at the mills. Soft annealed black wire is now 3.15c. a lb., galvanized soft wire 3.55c. a lb., common wire and cement coated nails 2.50c. a lb., all prices being for delivery within the Pittsburgh district. Price advances on other products will be announced within the next two weeks.

. . . Some sheets sold for first quarter.

o o o

. . . Pig iron buying light, shipments heavy.

CINCINNATI, Dec. 8. — Sheet users in this district have ordered all of the sheets that the mills would accept at fourth quarter prices and are now turning their attention to purchases for first quarter, apparently being apprehensive that the mills may get into a sold-up position for that period so that definite delivery promises would be difficult to obtain. The first quarter buying movement has not reached large proportions, but is sufficient to indicate the tenor of buying opinion. Sheet mills will carry over large backlogs to be cleared in January rollings. The American Rolling Mill Co. is operating at full capacity in all units, repairs at the Butler plant having been completed.

Production of ingots will be off a few points this week to about 91 per cent, as one interest placed an open hearth in reserve against possible breakdowns. Thirty-one out of 34 furnaces are now operating.

Pig iron sales are off as melters seek shipment of material under contract. Accordingly, movement of iron is expanding, but has not reached a pace which will insure completion of present commitments this quarter. A few fill-in orders constitute current new business. Foundry operations are up to about 85 per cent of capacity with majority of shops operating full time.

. . . Pig iron shipments at a high rate.

o o o

. . . M-K-T considering car building program.

ST. LOUIS, Dec. 8.—As was to be expected, buying of pig iron has subsided, melters having made commitments for the remainder of this year and well into the first quarter of 1937 before the recent advance of $1 a ton became effective. Shipments continue heavy, and it is predicted that the movement for December will be the largest for any month this year.

For the last six years, buying of pig iron has been only for immediate requirements, shipments keeping pace with the melt. Now, for the first time since the depression, melters are taking in iron to pile in their yards in anticipation of its consumption. The melt in the St. Louis territory continues at a high rate, with the prospects bright because of new railroad buying.

The plans of the St. Louis-Southwestern Railway for betterments in 1937, which have been reported in THE IRON AGE previously, are being held up, pending an appeal by the bondholders from the order of Federal Judge Davis directing that the improvements be paid for out of cash accumulated by the trustee.

It is understood that the management of the Missouri-Kansas-Texas Railway is considering a car building program, details of which have not been decided upon definitely.

Webb-Boone Paving Co. and the Chase Construction Co., St. Louis, are joint low bidders on the Vandeventer Avenue viaduct, St. Louis, requiring 250 tons of structural shapes.

Aluminum Co. Signs 40-hr. Week Agreement

EXCEPT for continuous process operations, the Aluminum Co. of America is on an 8-hr. day, 40-hr. week basis, with time and a half paid for work in excess of 40 hr. Although the company has been observing this principle generally for its 25,000 employees, an agreement has been signed covering these points with the National Council of Aluminum Workers, which represents about 16,000 of the company's workers. Time and a half will also be paid for work done on Sundays and holidays. Wage rates were left unchanged, a total of 10 per cent in increases having been made within the past year.

. . . . CHICAGO . . . .

. . . Ingot output half point higher, with mills putting on all pressure.

o o o

. . . Railroad equipment buying continues; recent rail orders total 900,000 tons.

o o o

. . . Pig iron shipments gaining; bessemer ferrosilicon and silvery iron advanced.

CHICAGO, Dec. 8.—Ingot production has again pushed forward and now stands at 77½ per cent of capacity, a gain of about one-half point. Pressure on mills is extreme, notwithstanding that all possible is being done by them to adjust rolling schedules to meet the new demand, which is strongly influenced by new rail and accessory production and a strong call for car materials. An attempt will be made to get out current rail orders by the end of the first quarter, but there will be an overrun.

Books are closed at the old prices on nearly all products, a few bars being available, as well as plates and shapes. The plan to cut off all unshipped old price tonnages as of Jan. 31 is not meeting with general accord. Some producers feel that an overrun beyond that date is their responsibility and that the buyers should not be penalized. This does not mean, however, that there is general carelessness in booking at the old prices because sellers are very anxious to begin as early as possible to realize on the new prices.

Car and locomotive business continues to roll into the market. The Seaboard, Montour, Chicago & North Western, and the Southern Pacific either have bought or are now in the market for new rolling stock. The Milwaukee Road may add 500 cars to those which are now being constructed in its Milwaukee shops.

The structural picture is somewhat better, though it is of less importance now that railroad business is booming.

The scrap market is near the boiling point with all prices strong and consumer resistance lessening.

Pig Iron

Shipments are above the November average and most sellers are of the opinion that this month's movement will surpass that of last month. Strikes have not been felt at furnaces for the reason that releases are in large part for stock and therefore do not measure the actual melt. Silvery iron and Bessemer ferrosilicon are being advanced $1.25 a ton.

Fluorspar

Prices for all grades are being marked up $1 a ton. Demand is heavy and shipments are at the peak of the year.

Coke

The November price of $9, Chicago ovens, is being used for December shipments. The movement is heavy and contains some extra tonnage, which users are storing as a matter of safety.

Rails

All railroads which had intended to make commitments this fall are fully covered, and it is estimated by Chicago producers that for the country as a whole not less than 900,000 tons of rails have been added to mill books. Counting track accessories at 30 per cent of the rail tonnage, these orders account for 270,000 tons. Mills are already at work on these new orders, which they plan to ship by the end of the first quarter. It is not expected that they can perform on such a schedule.

Structural Material

Fresh inquiries are more numerous, but none of them, with the exception of the Clinton, Iowa, dam, is large. The general run of requests for prices starts at 1200 tons for a field house at Purdue University and then drops to the type of project which requires less than 200 tons. An interesting phase of the market consists of a large number of old projects, many of which have bobbed up and down several times within the year and which are once again at the point where they may become orders. This is true of a half dozen Illinois overhead crossings. Awards are not impressive either in number or as to the size of individual lettings.

Plates

Railroad equipment orders and inquiries are still important factors in the steel market and there is more business of this kind which will soon be uncovered. Mills are already rolling some steel for recent equipment orders, and shipments of this kind of material will move up as fast as mills can adjust their schedules. This turn in events more or less completely obscures the comparatively scant tonnages which are coming from other plate consuming sources. The Seaboard Air Line has ordered 1000 cars and the Montour 500 hoppers. The Chicago North Western will purchase 1000 cars. One mill has marked up floor plates $3 a ton to 3.65c. a lb., Chicago, but other mills are slow in following this lead.

Bars

A rush of new business has pushed deliveries ahead seven to 10 days and some producers are near the point of closing books should they be satisfied that the steel industry will not ship against the lower prices after the end of January. All farm implement manufacturers are moving up their schedules, and tractor plants report that orders are on the increase. Labor troubles, which have resulted in curtailed automobile production, have not caused a hold-up in orders to be sent to mills. Rail steel bars are being marked $3 a ton to 2.10c., Chicago.

Wire Products

A steady stream of new business is being entered at the new prices and deliveries are being pushed forward under intense pressure exerted against mills, which are producing at 75 per cent of capacity. Jobbers find that distribution of manufacturing lines is better and

orders to mills are growing. Optimism as to spring trade in farm areas is being withheld for the reason that fall rains were disappointing and the winter starts with soil moisture less than that of a year ago in many of the areas which suffered drought last summer.

Cast Iron Pipe

One producer advanced prices $2 a ton, effective Dec. 7. On 6-in. and larger pipe the new price is $42 a ton, Birmingham, and $50.40 a ton, delivered Chicago. The $3 a ton differential on 4-in. pipe is unchanged. Both inquiries and sales are declining, which is a normal condition for this time of year. However, sellers believe that the market has fine possibilities for a strong spring demand.

Reinforcing Bars

Prices remain very spotty. The plan for Chicago schools is again under way. About 1100 tons will be used for 22 to 26 small buildings. Large awards in Chicago include 800 tons for a sewer and 800 tons for the second section of the Jane Addams housing project. The State of Illinois is moving slowly on bridges and has discontinued work on road slabs for the winter. Shop operations are slowly declining.

Cold-Rolled Strip

Deliveries now range from three weeks up, depending on the product. The character of users' wants is such that many units cannot produce at their practical rating.

Sheets

A number of producers have counted up orders and matched them with ability to deliver, with the result that books have been closed except when deliveries at the new prices are acceptable in February. A large part of the tonnage now moving to consumers will cover needs throughout much of the first quarter. Attractive tonnages of car roofing sheets are now being ordered and there is more of this business to come.

...German business exceeding that of 1926-1928.

° ° °

...Actual capacity production may be reached soon.

° ° °

...American seamen strike felt abroad.

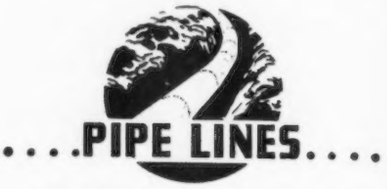
HAMBURG, Dec. 2 *(By Special Correspondence)*.—Business in the German iron and steel market is now exceeding that of the boom years, 1926 to 1928. Ordinarily demand falls off at this time of year, but this year it is very strong, in spite of restrictions placed upon jobbers with regularly large stocks not to buy steel beyond the average stocks of the first half of 1936. Delivery delays of five months are being accepted, and are no exception to the rule. Works are refusing to guarantee delivery promises. Theoretical capacity steel production is about 2,050,000 tons monthly, but the actual production which can be realized is estimated to be about 100,000 tons less. Present production is 1,800,000 tons a month and is closely approaching practical capacity of the industry so that deliveries, if demand continues, may soon be even further extended.

Demand is so heavy that in some cases building operations have been suspended, owing to the inability of the contractors to secure the necessary steel. Secondary industries, particularly machinery and ship yards, are requiring very large quantities of steel. Export trade has increased, but will probably be pegged at a maximum of about 300,000 tons monthly, excluding scrap and wire, and not allowed to rise above that figure. The recent price advance added about $300,000 a month to the net invoice receipts of the industry for export alone. Makers of ship plates are unable to meet the demand, prices having been advanced five shillings a ton. Scarcity of French ores is anticipated soon due to the reduction of working time there after Nov. 30 by the introduction of the 40-hr. week. The Saar industry, which is running at capacity, will be forced to look elsewhere for its ores.

Motor car sales have not declined in October and November, which is unusual since the German show will be held in February and current sales are still for 1936 models.

International Steel Tube Cartel negotiations at London, where 50 representatives of the European industry were assembled, broke down, due to the demands of some countries, particularly Germany, that 1936 export figures be used as a basis for allotments. Germany's exports were about 100 per cent above the allotment she had when the cartel broke up in March, 1935.

Effects of the American seamen strike have been felt in Germany. Many shipments sent by way of New York to Central America have been held up and a German steamer was dispatched there to collect the products.



Shell Pipe Line Corp., Shell Building, St. Louis, affiliated with Shell Petroleum Corp., same address, has authorized 10-in. welded steel pipe line from Hendricks area, Winkler County, Tex., to tank storage and distributing plant of last noted company at McCamey, Tex., for crude oil transmission. Cost over $600,000.

Havre, Mont., has secured Federal grant of $73,636 for municipal steel pipe line system for natural gas distribution, and will proceed with project at early date, including main welded steel pipe line for supply from neighboring gas field.

Panhandle Eastern Pipe Line Co., 101 West Eleventh Street, Kansas City, Mo., is arranging 1937 expansion program, to include new welded steel pipe lines for natural gas transmission from gas field at Amarillo, Tex., to different points in company territory extending north through Indiana and Michigan. Additional pipe line facilities will be installed to increase supply to Detroit City Gas Co., Detroit, from present daily rate of 40,000,000 cu. ft. to about 90,000,000 cu. ft. daily; a number of steel pipe line loops will be built from Dana, Ind., terminal to Detroit for this purpose, and which later will be developed into a parallel welded steel pipe line for increased service noted. Additional lines will be built in Michigan area; also in Illinois and Missouri, where supply is now being furnished to a number of utility companies for local distribution. Other welded steel pipe lines are planned in Ohio for service to Columbia Gas & Electric Co. in its different distributing areas. Fund of about $20,000,000 will be authorized for twelve months' construction, including expansion in present booster stations at various points and installation of new booster plants and other operating facilities.

Southern Nebraska Natural Gas Co., Holbrook, Neb., has awarded contract to Reece E. McGee, Blackwell, Okla., for welded steel pipe line from connection with present trunk main to town limits at Beaver City, Oxford and Arapahoe, Neb., about 15 miles, for natural gas transmission for distribution in these municipalities, where franchises have been secured. Cost about $175,000 including steel pipe line distributing systems at points noted.

Alabama Power Co., Birmingham, plans extensions in welded steel pipe line system near Phoenix City, Ala., to Girard district in that area, for natural gas transmission.

Humble Oil & Refining Co., Houston, Tex., has awarded contract for 120 miles of 10-in. pipe, about 12,000 tons, to National Tube Co., for natural gas transmission.

. . PHILADELPHIA . .

. . . Volume of business continues heavy.

o o o

. . . Deliveries creating serious problem.

o o o

. . . Ingot operations steady at 54½ per cent of capacity.

PHILADELPHIA, Dec. 8—There has been no noticeable shrinking in the incoming volume of new business inspired by announcements of higher steel prices for first quarter. In some items, books for this year have been closed, owing to the enormous amount of business placed in the past two weeks. Sellers are announcing that deliveries of tonnage taken at the lower prices must be completed by Jan. 31.

In spite of the rush of orders and the amount of tonnage being placed upon books, sellers are of the opinion that very little of the business is speculative, but is being purchased for use within the next few weeks, or for whatever delivery can be accomplished. Sales representatives are checking orders closely in order to assure themselves that steel is not being bought excessively for stock. Since the higher wage rates have been in force for nearly a month, it has become imperative that steel companies' incomes be increased, and they seem determined to benefit as much as possible from the price boost.

Some buyers who have been confronted by indefinite and prolonged deliveries, and have decided to cast about among the smaller mills for quicker shipment, may be surprised to find in some cases that the latter will gladly accept their business, but only at the higher prices. Those companies whose backlogs are not so extended as to make their shipment dates unattractive to customers are anxious to realize something from the price advance, and, although protecting their good customers, refuse to cater to some strange buyer who comes to them merely because his own mill can't give him what he wants in the way of deliveries.

Cold rolled strip has definitely been increased $5 per ton and silvery iron has been advanced $1.25 per ton, as has also Bessemer ferrosilicon.

The Baldwin Locomotive Works, which has benefited greatly from recent locomotive purchases, reports more orders on its books at present than at any time since the beginning of 1930, when much business placed in 1929 was still on hand. In the past week Baldwin has received orders for the construction of 20 locomotives, 15 for Denver & Rio Grande Western and 5 for Seaboard Air Line. A good year for the railroads and railroad equipment suppliers is being forecast for 1937.

Ingot operations are unchanged at 54½ per cent of capacity.

Heavy melting steel has advanced 50c per ton to a range of $15 to $15.50, and the scrap market shows unusual strength.

Structural activity is greater than for some time, over 2000 tons in awards and 5000 tons in inquiries being reported. The Reading purchased 7000 tons of rail from Bethlehem, 2000 tons being for the Jersey Central.

Pig Iron

Prices for first quarter have mostly been reaffirmed in this district, but in some quarters further advances are believed probable. There has been some buying for first quarter, but it has been very light so far, since most consumers are fairly well covered for the remainder of this month and consumers' stocks are a little heavier than previously. A pig iron shortage sometime next year is considered quite probable. Alan Wood Steel Co. has been working for some time on the larger furnace at Swedeland and it may go into blast in the near future. In this event, it is not known yet whether the smaller furnace, now operating, will be shut down. A Japanese inquiry for 50,000 tons has been sent here, but it is thought unlikely that American sellers will find this business attractive. The price of silvery iron was advanced $1.25 per ton, the base prices now being $25.25 at Buffalo and $24 at Jackson, Ohio.

Sheets and Plates

A tremendous demand has developed recently for sheets, and most sellers here are out of the market for December shipment. An effort will be made to clear this tonnage from the books by the end of January, but in some cases this may be impossible. Notwithstanding the flood of orders, little stock buying has been reported. Plates have been aided by the generally increased demand, backlogs in mills now amounting to from 10 days to six weeks. Railroad buying has, of course, been a helpful factor for this product. The Pennsylvania Railroad opened bids Tuesday on from one to five barges requiring about 80 tons of plates each. Tin plate demand is good for this time of year, backlogs being about three weeks. The greatest part of the present output is going into 1937 orders, but some is for general line can business immediately. Tin mill black, the price of which was increased, is much more active.

Strip

The amount of the increase of cold rolled strip, which up to now has been confused, has definitely been established at $5 per ton, while the first quarter skelp price is still unknown. At some mills backlogs on strip amount to as much as eight and ten weeks, and books have been closed for over a week for additional orders at fourth quarter prices. This situation is not prevalent, however, and some strip sellers can deliver much sooner, although hardly ever in less than four and five weeks.

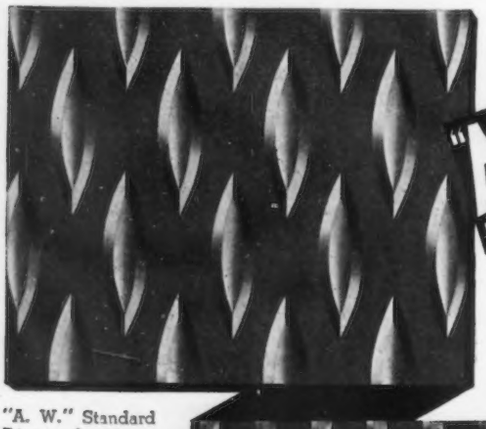
Shapes and Bars

The best week in structural awards for over a month was reported here for the last seven-day period. Bethlehem Steel Co. was awarded 600 tons for an Owens-Illinois Glass Co. building in Bridgeton, N. J., and 128 tons for a Pennsylvania State highway department bridge in Wyoming County. Work at the Navy Yard requiring 400 tons of shapes went to Lehigh Structural Steel Co., while Belmont Iron Works received 350 tons for a building at Gloucester, N. J.,

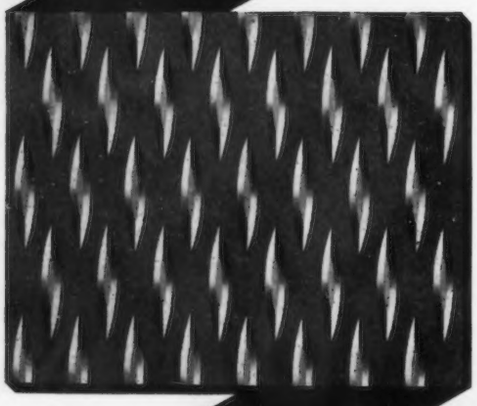
600 tons for a building addition in Virginia, and 140 tons for work at Streator, Ill. In addition, State highway projects totaling over 1000 tons of shapes, and a bridge over the Delaware at Easton, Pa., requiring 4500 tons, to be bid on Dec. 21, were announced. Backlogs on shapes are about three weeks. Demand for bars is good, backlogs amounting to from four to five weeks in the heavy sizes, and from two to three weeks in lighter sizes. Reinforcing bars are quiet and no outstanding inquiries have been announced.

Imports

The following iron and steel imports were received here last week: 6250 tons of iron ore from Algeria; 5612 tons of chrome ore from Cuba; 129 tons of pig iron from Norway; 399 tons of pig iron from British India; 50 tons of manganese ore from England, and 167 tons of ferromanganese from the Netherlands.



"A. W." Standard Diamond pattern, half size. For heavy traffic duty where high projections are of advantage.

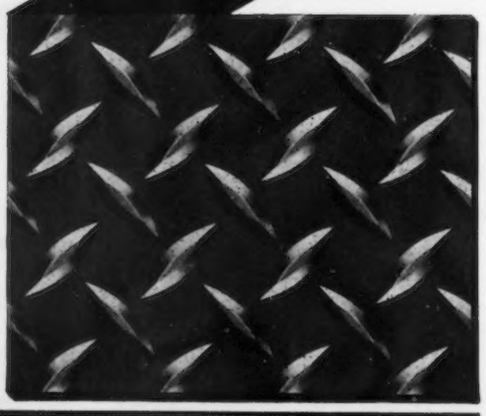


"A. W." Diamondette pattern, half size. Ideal for pedestrian traffic and light trucking. Noiseless.

"A. W." Super-Diamond pattern, half size. Completely safe tread, from every possible angle, under any condition.

Low first cost, no maintenance cost

Quick installation without disturbing men or production. Cut to any required shape. Slip proof, oil proof, heat proof, crack proof. Toughest traffic can't damage or impair it. PERMANENT. Immediate delivery, in various patterns to meet all requirements.



ALAN WOOD STEEL COMPANY
CONSHOHOCKEN, PA.
BRANCHES:
Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston

110 YEARS' IRON- AND STEEL-MAKING EXPERIENCE

. . . BOSTON . . .

. . . Pig iron prices now generally higher.

o o o

. . . Indian iron is also advanced $1.25 a ton.

BOSTON, Dec. 8.—For first quarter delivery, Indian iron has been increased $1.25 a ton base to $22.75 on cars local dock, following an advance, effective immediately, last week by the Mystic Iron Works. Other domestic furnaces that sell in New England are now quoting the prices announced by Mystic for delivering at places for which the Mystic furnace is the basing point. Prior to going out of blast Dec. 1, the Mystic furnace laid in a large stock of iron.

Bolt and nut prices will be about 10 per cent higher after Jan. 1, and rivets $4 a ton. Warehouses very likely will lift prices on most steel mill products at the turn of the year.

New England metalworking industries are active. Developments include a new Springfield, Mass., oil heating and air conditioning manufacturing plant and a Terryville, Conn., lock making plant addition; Waterbury, Conn., foundry addition, and a Bridgeport, Conn., meter manufacturing plant.

Carnegie-Illinois Sets Deadline on Shipments

THE Carnegie-Illinois Steel Corp.'s district sales offices have been notified that all products which were sold at fourth quarter prices for shipment at mills' convenience must be shipped complete by Dec. 31 or as soon thereafter as operating schedules will permit. It is realized that on some commodities requiring finishing operations beyond the actual rolling, it will be impossible to set a definite completing date but on such commodities shipment must be completed by Jan. 31, at the latest.

The announcement stated further that tonnage which cannot be completed by Jan. 31 will, on and after Feb. 1, be billed at the newly announced prices for the first quarter.

. . . CLEVELAND . . .

. . . Heavy backlogs of orders keep steel operating rates high.

o o o

. . . Buying at old prices shut off in sheets, strip and some other products.

o o o

. . . New price advances cover bolts and nuts, large rivets, merchant rail steel and silvery pig iron.

CLEVELAND, Dec. 8.—With heavy backlogs of business in both finished and semi-finished steel taken at fourth quarter prices, mills are maintaining ingot output at the recent high rate. The Cleveland-Lorain area is operating this week at 76 per cent of capacity and the Youngstown district is at 78 per cent, the same as last week.

The rush by consumers to get under cover at the old prices has to some extent subsided. This is due to the decision of mills to take no more business in some products at fourth quarter prices and to the fact that many consumers have already closed for all the steel they wish to make commitments for. While sheet mills generally have entered so much tonnage that they have withdrawn from the market, some producers are still taking sheet orders at fourth quarter prices for January delivery. Strip mills have withdrawn from the market on cold strip and have little hot strip available. Wire rods have been in very heavy demand and producers have discontinued taking any more fourth quarter orders. Good backlogs of orders for wire products have been accumulated. The recently announced higher prices are being quoted for the first quarter.

Some of the sheet mills announce that they are entering no orders at the old price that they cannot ship by Jan. 31 and the same rule probably will be applied rather generally to other products. Considerable of the eagerness of sheet consumers to get under cover has been caused by their anxiety to get orders on mill books to assure them deliveries when needed. It is estimated that during the late rush in sheet business only 25 per cent of the buying has been of a speculative character. Some stamping plants doing automotive work are understood to have purchased enough sheets to last them through the first quarter.

Rail buying was finished this week by roads in this territory with the purchase of 2000 tons by the Wheeling & Lake Erie.

Price announcements include advances of $4 a ton on large rivets, 10 per cent on bolts and nuts, and $3 a ton on merchant rail steel bars.

Bars, Plates and Shapes

Mills continue to enter a fair volume of business in merchant bars, but can still take business for December rolling. In the construction field protection has been taken for heavy tonnages of structural steel for prospective work. Some mills have adopted a rule that they must have definite releases by March 31 for steel placed at fourth quarter prices for identified projects, the steel to be shipped thereafter at mills' convenience. Bids were taken yesterday for the Republic Steel Corp. strip mill in Cleveland requiring approximately 14,000 tons and an award is expected this week. Several Cleveland contractors are figuring on the sewage disposal plant in Buffalo requiring 1500 tons in bars, shapes and steel piling, for which bids were opened today. Rail steel bars for merchant trade have been advanced $3 a ton for the first quarter.

Pig Iron

Quite a few sales in lots up to 300 tons have been made for the first quarter at the $1 a ton price advance and a few small foundries have purchased car lots for December shipment at the higher price. Shipping orders are heavy and indicate a movement this month far in excess of any recent month. Large quantities of iron are being taken by motor car foundries. Advance of $1.25 a ton on silvery iron and Bessemer ferro silicon were announced late last week, making $24, Jackson, the base price for Ohio silvery and $25.25 the base at Buffalo. Differentials are unchanged. With the mounting fuel and other costs, some makers of standard grades of pig iron are predicting another price advance to become effective around March 1.

Sheets

Most mills have withdrawn from the market on all grades and some have their entire capacity taken up for January so that they are entering no tonnage at the advanced prices except for delivery after Jan. 31. Quite a few sales have been made at the new prices, including orders from the motor car industry, for February delivery. Some business also has been placed for delivery in March. Jan. 31 will be pretty closely drawn as the dividing line between billing at the old and new prices. The terms of some contracts provide that sheets shipped by Jan. 31 are to carry the old prices, but any tonnage shipped later will be at the advanced prices. Considerable business which mills had to turn down was offered at the old prices during the week.

Bolts, Nuts and Rivets

Large rivets have been advanced $4 a ton to $3.25 per 100 lb., Cleveland and Pittsburgh, and $3.35, Chicago and Birmingham, effective immediately and for the first quarter. Small rivets are unchanged. The price advance on bolts and nuts announced a week ago amounts to about 10 per cent and became effective immediately for current orders as well as for the first quarter. Cap and set screws are unchanged.

Strip Steel

Cold-rolled strip steel finally has been established at 2.85c., Pittsburgh and Cleveland, for the first quarter, an advance of $5 a ton, or $1 a ton more of an advance than several makers previously had announced. The advance on the commodity grade and lamp stock re-

mains at $4, as originally announced. Stepping up the advance on cold strip $1 a ton more will be helpful to small cold rolling plants in that it increases to that extent the spread between what they will pay for hot strip and what they will receive for their product. Mills are out of the market for cold strip at fourth quarter prices, but some can take on a little more hot-rolled strip for January shipment.

Pittsburgh Business At Seven-Year High

PITTSBURGH, Dec. 8.—Business activity in the Pittsburgh district for the week ended Nov. 28, as measured by the Bureau of Business Research, University of Pittsburgh, reached the highest point in seven years and was only one point lower than the same period in 1929. The business activity index which is given in terms of per cent of normal, after allowance was made for seasonal change and trend, stood at 106.1 per cent.

....BUFFALO....

. . . Silvery iron price raised to $25.25.

° ° °

. . . Steel production at unchanged level.

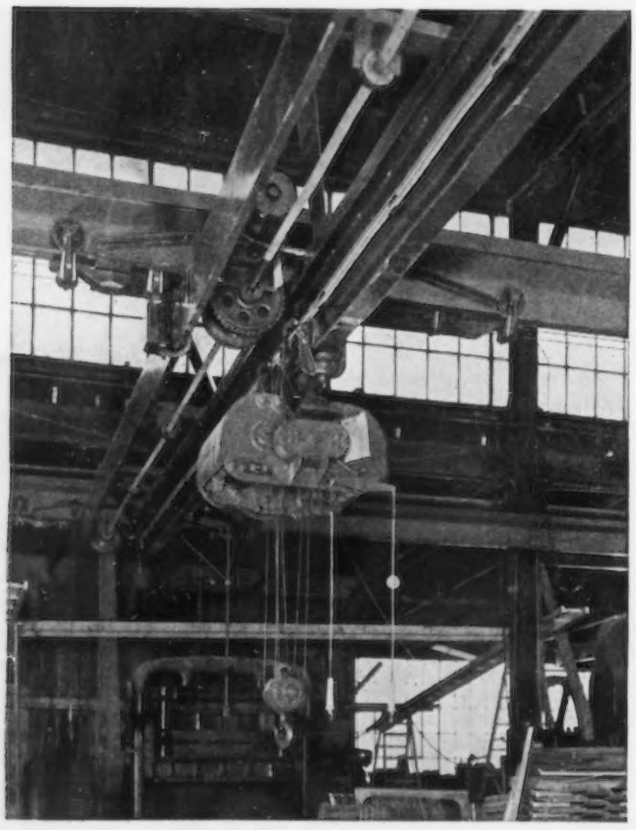
BUFFALO, Dec. 8.—With the increase of the Jackson, Ohio, price on silvery iron to $24 the Buffalo price for this grade is stepped up to $25.25, following the $1.25 differential between the two bases. Blast furnace ferro-silicon business has shown a very satisfactory increase. No heavy amount of buying of other irons is expected until January.

Buffalo open-hearth operations remain the same: Bethlehem's Lackawanna plant, 22; Republic Steel Corp., 7, and Wickwire-Spencer Steel Co., 2.

The Transit Road grade crossing elimination job, originally reported at 400 tons of structural steel, will run about 1000 tons. The general contract bids include only the steel for the New York Central work, which will be about 400 tons. The Lehigh Valley and Erie track eliminations will raise the tonnage on this job to the above mentioned figure.

Two other jobs are being figured by structural fabricators; one is 125 tons for a building at the National Aniline & Chemical Co. plant and the other 100 tons for a building at the Hooker Electrochemical Co. plant, Niagara Falls. A new school at Odessa, N. Y., and a hospital addition at Lockport, N. Y., will together require 200 tons of structural steel. A new incinerator to be built at Rochester, N. Y., will require an undetermined tonnage of structural for the framework, also reinforcing bars. The Transit Road (Buffalo) grade crossing elimination will require 150 tons of reinforcing bars.

Warehouse business has been good. New prices will be issued this week.



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. . . . NEW YORK. . . .

. . . Heavy tonnages pour in on steel companies' sales offices.

o o o

. . . Some business sent in at fourth quarter prices returned to buyers.

o o o

. . . New ruling on identified projects gives protection to Dec. 31.

NEW YORK, Dec. 8.—Although Dec. 1 was the deadline on the acceptance of steel business at fourth quarter prices for shipment on or before Jan. 31, belated tonnages flowed into steel companies' sales offices all of last week. The heaviest pressure was in sheets, and some companies returned to their customers a good many orders tendered at fourth quarter prices with the explanation that books were filled through January and such orders could be accepted only at the first quarter quotations. In some instances the orders were returned to the steel companies with permission to bill at the new prices.

November business with many offices was record breaking. One company received through its New York office a greater tonnage last month than it booked in all of 1932, and a single day's total was in excess of the best quarterly total of 1933.

Now that the rush for low-price protection for manufacturers' and jobbers' requirements is over, the mills are turning their attention to identified construction projects, including railroad equipment, on which a definite policy has been established by the larger companies by which protection at fourth quarter prices will be afforded on any work quoted on up to and including Dec. 31, with the understanding that a definite contract shall be entered into by Jan. 31 and that specifications shall be entered with the mill on or before March 31, with rolling and shipment at mill convenience. This undoubtedly means that a good deal of the construction work hanging over the market, which includes some very large projects, will reach the final contract stage in time to take advantage of the price protection thus afforded. On this basis, a good deal of rolling of plates, shapes, bars and pipe for such projects will go over into the second quarter of 1937. An exception is sheets, on which mills will now offer no protection on identified projects except at the new prices. However, there were many protections taken at the old prices prior to Dec. 1. An example of the volume of work that may flow into the mills during the early part of 1937, protection was given to one company on steel for 17 oil refineries. There is also a large volume of oil tankage and other tank work outstanding, besides many large construction projects such as subways, bridges, viaducts, etc.

The World's Fair site on Long Island, which is now under preparation for the construction of buildings, has already taken a fair-sized tonnage of pipe, and bids have been requested on about 700 tons of sheet piling for the marine basin. Two highway approaches to the Fair will require viaducts that call for about 2000 tons of fabricated steel. Grade elimination work for the State of New York at Little Falls, N. Y., will take about 1000 tons of steel and bids will be opened Dec. 10 on a section of the Sixth Avenue subway, New York, taking about 5000 tons of fabricated structural work.

The Atlantic Coast Line has ordered 4000 tons of rails, which are to be added to 6000 tons bought several weeks ago.

Tin plate orders are showing an increase in anticipation of an increased demand for packers' cans in 1937. Because of this year's shortages in packs of some vegetables, as a result of the drought, it is expected that 1937 consumption of tin plate will exceed that of this year by a substantial margin—possibly 10 per cent or more. New uses for tin plate, such as cans for beer, wine and soft drinks, will also add to tin plate requirements.

Pig Iron

A moderate number of sales at the new price have been made. Although none of the producers that regularly sell iron into New England has announced any further change in the f.o.b. furnace prices, all of them are using the higher Everett, Mass., base in quotations to those New England points for which Everett is the nearest basing point. This price, as announced last week, was advanced $1.25 a ton, effective immediately. The Mystic stack at Everett, which was responsible for the advance and which went out of blast on Dec. 1, is said to have accumulated 50,000 to 60,000 tons of pig iron in stock prior to suspending operations. Consumers of iron in the New York district are taking deliveries actively, in some instances for carryover into the first quarter.

Reinforcing Steel

Awards this week were light, no important tonnages being placed. Inquiries, too, were few and no large projects requiring reinforcing bars have been announced. A fairly large number of small jobs have developed in New Jersey, largely as a result of public funds being turned to road improvements, bridge structures, etc. The price situation seems to have gained some additional stability in sympathy with the price increases being announced on other steel products. Some warehouses which handle reinforcing steel are expecting an increase in bars sometime soon.

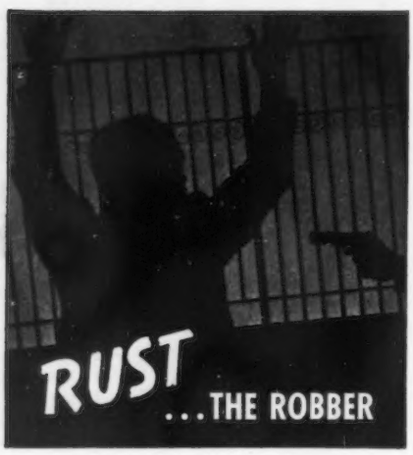
Ferromanganese

Leading sellers have advanced quotations $5 a ton for first quarter deliveries. The new price is $80 a gross ton, f.o.b. New York, Philadelphia, Baltimore, Mobile or New

Orleans, for carlots of the 80 per cent Mn domestic grade.

Fluorspar

Domestic sellers have advanced quotations $1 a net ton to $19 for the 85-5 grade, effective immediately. On the strength of this rise and in view of the restricted shipments from Spain, sellers of foreign fluorspar likewise have raised prices $1 to $23 a net ton, c.i.f. Atlantic ports, duty paid.



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CANADA

. . . Steel mills limiting deliveries as prices are to advance.

TORONTO, Ont., Dec. 8. — Steel mills are taking orders for bars and a few other lines to the middle of January, but otherwise are not booking forward delivery contracts. Bar prices are to be moved up about the middle of this month and new price lists now are being prepared. Pig iron prices at Toronto and Montreal are unchanged, but advances have been announced for some outside points. Iron and steel scrap prices are holding firm and while dealers have announced no change for the week, some are paying above list for desirable lots.

Canadian steel interests continue to look for further munitions orders from Great Britain and plants are being improved to take care of business of this character.

..SAN FRANCISCO..

. . . New bids called for on two large jobs.

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. . . Maritime strike hurting steel trade.

SAN FRANCISCO, Dec. 7.—Bids on two large projects which were to have been awarded this fall have been thrown out, with the calling of new bids set indefinitely for some time next year. Largest of these was the steel floating drydock scheduled for Pearl Harbor, T. H., which involves about 40,000 tons of steel. The lowest bid on the project far exceeded the $10,000,000 appropriation made for the project. Only two contractors submitted bids on the Los Angeles Federal Building, both of which exceeded the appropriation granted. This combined post office and jail involves 20,000 tons of structural and 5000 tons of reinforcing steel.

Structural steel awards last week, helped materially by a 1199-ton award for a railroad overpass in Denver to American Bridge Co., aggregated 2898 tons. Reinforcing bar awards, with no large and few small lettings, totaled only 1643 tons, one of the smallest totals of any week during the past year.

The maritime strike continues to have an adverse effect on the steel market.

..BIRMINGHAM..

. . . Markets quieter after weeks of heavy buying.

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. . . Hardie-Tynes Mfg. Co. gets large contract.

BIRMINGHAM, Dec. 8. — The iron and steel markets are rather quiet just now, after several weeks of heavy buying before the new prices became effective. Blast furnaces and steel mills have large backlogs and high operations are assured for some time to come. The steel mills have set Jan. 31 as the time limit for shipments against present orders. It is also likely that specifications against fourth quarter iron contracts will be extended into January.

Blast furnace and open hearth operations remain steady, with 15 furnaces and 16 open hearths active.

Last week Hardie-Tynes Mfg. Co. was awarded contract by the Government for 20 sets for the Grand Coulee Dam. The cost will be more than $1,000,000 and the work will require more than 5000 tons of iron and steel.

Mobile & Ohio Railroad placed an order for 700 tons of rail with the Tennessee Coal, Iron & Railroad Co., which are to be rolled this month.

Hearings were resumed last week by the special arbitration board on the ore mining wage plan of the Tennessee Coal, Iron & Railroad Co. This board is composed of representatives of the company, the miners and the governor of Alabama and was appointed at the time the strike was settled.

Tennessee Coal, Iron & Railroad Co. has booked 6000 tons of bars from the T.V.A. for construction work at Pickwick Landing Dam.

. . .NON-FERROUS. . .

. . . Zinc stocks reduced 11,400 tons in November.

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. . . Tin quotas may be lowered; lead unchanged.

NEW YORK, Dec. 8.—Domestic copper markets were little changed last week. Quiet volume of trading continued, with week-end sales of 1222 tons. Total orders for the month rose to 3246 tons. The price held firm and quotably unchanged at 10.50c. a lb., Connecticut Valley. Activity in the copper and brass fabricating industry, in the absence of other features, is drawing increased attention. Heavy order backlogs suggest a sustained schedule for some months ahead. Foreign copper markets, which slumped in price over latter part of the previous week, are pointing upward again, and better export business, encountered yesterday, established quotations at from 10.62½c. to 10.65c. a lb., c.i.f., usual European ports.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 2	Dec. 3	Dec. 4	Dec. 5	Dec. 7	Dec. 8
Electrolytic copper, Conn.*	10.50	10.50	10.50	10.50	10.50	10.50
Lake copper, N. Y.	10.62½	10.62½	10.62½	10.62½	10.62½	10.62½
Straits tin, spot, New York	51.25	50.80	50.62½	....	50.75	51.62½
Zinc, East St. Louis	5.05	5.05	5.05	5.05	5.05	5.05
Zinc, New York†	5.42½	5.42½	5.42½	5.42½	5.42½	5.42½
Lead, St. Louis	5.05	5.05	5.05	5.05	5.05	5.05
Lead, New York	5.20	5.20	5.20	5.20	5.20	5.20

* Delivered Connecticut Valley; price ¼c. lower delivered in New York.
† Includes emergency freight charge.
Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 17.00c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.62½c. a lb., New York.
Quicksilver, $88.50 to $92.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 10.65c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	52.50c. to 53.50c.
Tin, bar	54.50c. to 55.50c.
Copper, Lake	11.50c. to 12.50c.
Copper, electrolytic	11.50c. to 12.50c.
Copper, castings	10.75c. to 11.75c.
*Copper sheets, hot-rolled	17.75c.
*High brass sheets	15.87½c.
*Seamless brass tubes	18.12½c.
*Seamless copper tubes	18.25c.
*Brass rods	13.87½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.75c. to 6.75c.
Lead, bar	6.75c. to 7.75c.
Lead, sheets, cut	8.75c.
Antimony, Asiatic	13.00c. to 14.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

* These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.25c.
Tin, bar	57.25c.
Copper, Lake	11.50c. to 11.75c.
Copper, electrolytic	11.50c. to 11.75c.
Copper, castings	11.25c. to 11.50c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig	5.90c. to 6.10c.
Lead, bar	8.50c.
Antimony, Asiatic	15.25c.
Babbitt metal, medium grade	20.25c.
Babbitt metal, high grade	60.25c.
Solder, ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.12½c.	8.87½c.
Copper, hvy. and wire	8.00c.	8.50c.
Copper, light and bottoms	7.25c.	7.75c.
Brass, heavy	4.87½c.	5.50c.
Brass, light	4.00c.	4.75c.
Hvy. machine composition	7.00c.	7.50c.
No. 1 yel. brass turnings	6.00c.	6.50c.
No. 1 red brass or compos. turnings	6.75c.	7.25c.
Lead, heavy	4.25c.	4.62½c.
Sheet aluminum	13.25c.	14.75c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.

Lead

Representative inquiry from cable, pigment, battery and foil makers continues to create a fair outlet for lead. While flow of business is not comparable to the earlier situation in which upward price movement was a feature, existing quotations as based on 5.05c. a lb., St. Louis, and 5.20c., New York, are very firm. With current London quotations for the metal equivalent to about 5.12c. a lb., the undertone is further strengthened. Rate of domestic inquiry continues to absorb producers' daily allotments in certain directions and waiting lists have held over. November shipments are being estimated at between 53,000 and 55,000 tons, and stocks are expected to drop by between 13,000 and 15,000 tons.

Zinc

Stocks of all grades of slab zinc decreased 11,365 tons during November to 57,527 tons at the month's end. November shipments increased 3072 tons over October to 57,107 tons, and production declined 555 tons to 45,742 tons. In prime Western grade zinc there was a drop in the stocks of 4604 tons to 45,829 tons, equivalent to less than two months' consumption as based on November shipments of this grade of 25,646 tons. Stocks of all grades of about 57,500 tons contrast with month-end unfilled orders of 75,891 tons. In line with its strong statistical position, the zinc market continued quotably firm all week at 5.05c. a lb., East St. Louis. Demand was quiet on sales of 3342 tons.

Tin

Although prolongation of the shipping strike has caused New York spot tin supplies to tighten additionally, the market last week attracted little consumer interest. Yesterday, however, demand was stimulated by news that output quotas might be reduced again to 95 or possibly 90 per cent of standard tonnage when the international tin committee meets on Dec. 11. With buying on a substantial scale since yesterday, the spot Straits price here has mounted 1c. from its week-end low, and is quotable at 51.62½c. a lb. Official London prices this morning were £228 10s. on both spot and future standard. The Eastern quotation was £229 10s.

IRON AND STEEL SCRAP

. . . Composite advances 33c. to $16.50, highest level since Nov. 2.

o o o

. . . All markets strong as buying reappears in important districts.

A MODERATE amount of buying has reappeared in several steel-making centers, but heavy purchasing is yet to come. The buoyancy of current prices is entirely in anticipation of this coming demand, which sellers confidently expect will appear in the near future as the result of mounting steel production schedules. The market likewise has gained support from the high bids paid on several recent railroad lists. Advances of 50c. at Pittsburgh and eastern Pennsylvania have forced the composite figure up 33c. to $16.50 a gross ton, the highest level reached since Nov. 2 and only 25c. under the peak price for the year of $16.75, established in the period Sept. 22 to Oct. 6. Although the strength in domestic quotations continues to discourage additional export sales, a little new buying came into the market during the past week. Deliveries on old orders dropped considerably during October, amounting to only 120,000 tons compared with 157,135 tons in September.

Pittsburgh

The market has taken on a considerably stronger tone. For the past week brokers have been paying $17.50 for No. 1 steel to cover orders taken at $17.50. While a few odd cars have been picked up at $17.25, no tonnage can be obtained at this price. Sales of No. 1 steel and compressed sheets, involving moderate size tonnages, were made into consumption at $18 within the past week. The recent railroad list brought around $18.50, delivered, for railroad No. 1. These factors make the market definitely quotable at $17.50 to $18, a boost of 50c. over previous quotations. The specialty market is exceptionally strong and it is the opinion of some brokers that railroad specialties will be bringing better than $22 a ton in the near future.

Chicago

There is strong price disagreement between mills and brokers with the edge turning toward the latter. Prices are strong all along the line, and a touch of near-zero weather is working against the consumers' viewpoint. Railroads have received more than $17 for heavy melting steel. Another new factor in this market is the use of scrap by the new Sterling, Ill., mill, which is using country mixed, No. 2 shoveling and some heavy melting steel. Railroad car wrecking is an indeterminable factor in the market, but heavy repairs to rolling stock are under way on a broad scale and considerable car scrap is beginning to come into the market.

Cleveland

Blast furnace scrap was established at higher levels by a purchase at $12.50 made by a Cleveland mill during the week. Quotations on blast furnace grades have been advanced 75c. a ton. These grades have been scarce for some time and brokers have had difficulty in covering against old orders. Steel-making scrap is very firm but inactive.

Philadelphia

The price undertone has strengthened materially on the basis of higher consumers' bids and higher brokers' offers. Consequently No. 1 steel is quotable 50c. higher at $15 to $15.50. Firm mill offers of $15 have not resulted in sales. Shipments on old orders have generally eased off slightly, with the exception of one large district mill which reports sustained heavy deliveries. The Budd December list of 3800 tons of bundles was divided among three or four district mills at a price equal to or slightly higher than quoted figures.

Buffalo

The market is strong, particularly for specialties. Mill operations indicate a steady consumption of scrap for at least 60 and possibly 90 days. While there have been no large mill purchases during the week, indications are that consumers may again come into the market soon. Dealers believe No. 1 and No. 2 steel should bring $17 and $15.50 respectively. Lake shipments are nearly all unloaded. Recent railroad lists brought higher prices.

Boston

Prices are strengthening all along the line with business slowly gathering momentum. Steel turnings and bundled skeleton are easily 25c. a ton higher, dealers are paying on the basis of $17.50 a ton, delivered Pittsburgh, or better for No. 1 steel, the shafting price is considerably improved, exporters have raised bids for Nos. 1 and 2 steel 25c. a ton, cleaned engine blocks are $9.50 to $10 a ton on cars, long bundled cotton ties $7.40 and short $8, both being higher. Two steamers here are loading scrap for England, and another is due within a week or 10 days. Railroads have proposed to reduce current free time on scrap metal at the Army Base from 10 to 5 days and to increase storage charges after free time expiration for a period of 10 days, increased charges then to be eliminated for 10 days. No definite action has been taken.

New York

Expanding mill activity in adjacent areas has forced consumers back into the market, and prices of various grades of scrap have consequently increased. New York dealers in old materials are now paying as high as $12 for No. 1 steel, or 25c. more than a week ago. Relatively few transactions at present in No. 2 steel obviate necessity for advancing this quotation also, but the tendency is upward and a higher level should take effect shortly.

Detroit

There has been practically no change in this market during the week, with the possible exception of low phos plate scrap, which has gone up 50c., largely owing to buying on the part of out-of-town brokers. No important lists have been issued by any of the large plants in the past week, and purchases by local mills have been negligible. Brokers feel the market has a stronger tone, however, and No. 1 steel is expected to take an upturn in sympathy with other markets.

Cincinnati

Heavy mill activity adds to bullishness of the scrap market, although sales are small. Some inquiry the past week added substance to dealer opinion of heavy demand near the end of the year. Bids have been advanced 50c. on the whole list as dealers compete for available material.

St. Louis

An East Side melter bought between 10,000 and 15,000 tons of heavy melting steel from four dealers for delivery over the next 60 days at an advance of 25c. While there still is a considerable short interest, open weather and higher prices are bringing out supplies.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.50 to $18.00
No. 2 hvy. mltng. steel.	16.00 to 16.50
No. 2 RR. wrought....	17.50 to 18.00
Scrap rails	18.00 to 18.50
Rails, 3 ft. and under..	20.00 to 20.50
Comp. sheet steel	17.50 to 18.00
Hand. bundled sheets..	16.50 to 17.00
Hvy. steel axle turn...	16.00 to 16.50
Machine shop turn.....	12.00 to 12.50
Short shov. turn.	12.50 to 13.00
Mixed bor. & turn.....	12.00 to 12.50
Cast iron borings	12.50 to 13.00
Cast iron carwheels...	17.50 to 18.00
Hvy. breakable cast...	14.50 to 15.00
No. 1 cast	16.50 to 17.00
RR. knuckles & cplrs..	21.00 to 21.50
Rail coil & leaf springs	21.00 to 21.50
Rolled steel wheels....	21.00 to 21.50
Low phos. billet crops.	21.50 to 22.00
Low phos. sh. bar....	21.00 to 21.50
Low phos. punchings..	20.50 to 21.00
Low phos. plate scrap.	20.50 to 21.00
Steel car axles	20.50 to 21.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to $16.00
No. 2 hvy. mltng. steel.	14.50 to 15.00
Comp. sheet steel	15.00 to 15.50
Light bund. stampings	11.50 to 12.00
Drop forge flashings..	14.50 to 15.00
Machine shop turn.....	11.25 to 11.75
Short shov. turn.....	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
Steel axle turnings....	12.00 to 12.50
Low phos. billet crops	19.00 to 19.50
Cast iron borings	11.50 to 12.25
Mixed bor. & turn....	11.50 to 12.25
No. 2 busheling	11.50 to 12.25
No. 1 cast	18.00 to 18.50
Railroad grate bars...	9.00 to 9.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	16.50 to 17.00
Railroad malleable ...	17.75 to 18.00
Cast iron carwheels...	.... 15.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng steel.	13.50 to 14.00
Hydraulic bund., new..	15.00 to 15.50
Hydraulic bund., old..	12.50 to 13.00
Steel rails for rolling..	17.00 to 17.50
Cast iron carwheels..	16.50 to 17.00
Hvy. breakable cast...	.... 15.50
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	.... 12.50
Railroad malleable ...	16.50 to 17.00
Machine shop turn....	9.50 to 10.00
No. 1 blast furnace....	8.50 to 9.00
Cast borings	8.00 to 8.50
Heavy axle turnings..	12.50 to 13.00
No. 1 low phos. hvy...	20.00 to 20.50
Couplers & knuckles ..	20.00 to 20.50
Rolled steel wheels ...	20.00 to 20.50
Steel axles	20.50 to 21.00
Shafting	20.50 to 21.00
No. 1 RR. wrought....	16.00 to 16.50
Spec. iron & steel pipe.	13.50 to 14.00
Bundled sheets	14.00 to 14.50
No. 1 forge fire.....	14.50 to 15.00
Cast borings (chem.).	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.....	$16.25 to $16.75
Auto. hvy. mltng. steel.	14.00 to 14.50
Alloy free	15.00 to 15.50
Shoveling steel	16.25 to 16.75
Hydraul. comp. sheets.	15.50 to 16.00
Drop forge flashings..	14.00 to 14.50
No. 1 busheling	14.75 to 15.25
Rolled carwheels	18.50 to 19.00
Railroad tires, cut	18.50 to 19.00
Railroad leaf springs..	18.25 to 18.75
Axle turnings	15.00 to 15.50
Steel coup. & knuckles	18.25 to 18.75
Coil springs	19.50 to 20.00
Axle turn. (elec.)	16.00 to 16.50
Low phos. punchings..	19.00 to 19.50
Low phos. plates, 12 in. and under	19.00 to 19.50
Cast iron borings	9.50 to 10.00
Short shov. turnings..	11.00 to 11.50
Machine shop turn....	8.50 to 9.00
Rerolling rails	17.00 to 17.50
Steel rails under 3 ft...	17.50 to 18.00
Steel rails under 2 ft...	19.50 to 20.00
Angle bars, steel	18.00 to 18.50
Cast iron carwheels ..	17.00 to 17.50
Railroad malleable	18.50 to 19.00
Agric. malleable	.... 15.00
	Per Net Ton
Iron car axles	$19.00 to $19.50
Steel car axles	18.50 to 19.00
No. 1 RR. wrought....	$14.25 to $14.75
No. 2 RR. wrought....	14.50 to 15.00
No. 2 busheling, old...	6.00 to 6.50
Locomotive tires	13.00 to 13.50
Pipes and flues	10.00 to 10.50
No. 1 machinery cast..	14.50 to 15.00
Clean auto. cast	13.50 to 14.00
No. 1 railroad cast....	13.50 to 14.00
No. 1 agric. cast	11.00 to 11.50
Stove plate	8.75 to 9.25
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$16.00 to $16.50
No. 2 hvy. mltng. steel.	14.50 to 15.00
Scrap rails	16.00 to 16.50
New hy. b'ndled sheets	14.50 to 15.00
Old hydraul. bundles ..	13.00 to 13.50
Drop forge flashings ...	14.50 to 15.00
No. 1 busheling	14.25 to 15.00
Hvy. axle turnings....	10.50 to 11.00
Machine shop turn....	9.50 to 10.00
Knuckles & couplers..	19.50 to 20.00
Coil & leaf springs....	19.50 to 20.00
Rolled steel wheels....	19.50 to 20.00
Low phos. billet crops.	19.50 to 20.00
Short shov. turnings..	10.00 to 10.50
Mixed bor. & turn.....	10.00 to 10.50
Cast iron borings	10.00 to 10.50
No. 2 busheling	11.00 to 11.50
Steel car axles	17.00 to 17.50
Iron axles	12.00 to 12.50
No. 1 machinery cast..	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft..	17.50 to 18.00
Cast iron carwheels...	15.50 to 16.00
Railroad malleable	17.00 to 18.00
Chemical borings	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.....	$12.50 to $13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings..	.... 8.00
Stove plate	.... 8.50
Steel axles	.... 15.00
Iron axles	.... 15.00
No. 1 RR. wrought....	.... 10.00
Rails for rolling	.... 14.00
No. 1 cast	.... 13.50
Tramcar wheels	.... 13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. steel....	$15.25 to $15.75
No. 1 hvy. melting....	14.50 to 15.00
No. 2 hvy. melting....	13.50 to 14.00
No. 1 locomotive tires..	13.50 to 14.00
Misc. stand.-sec. rails.	15.75 to 16.25
Railroad springs	17.25 to 17.75
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought ...	15.25 to 15.75
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.....	5.50 to 6.00
Rails for rolling	16.75 to 17.25
Machine shop turn....	4.00 to 4.50
Heavy turnings	10.50 to 11.00
Steel car axles	18.00 to 18.50
Iron car axles	19.00 to 19.50
No. 1 RR. wrought....	12.50 to 13.00
Steel rails under 3 ft..	13.00 to 13.50
Steel angle bars.....	15.50 to 16.00
Cast iron carwheels...	14.00 to 14.50
No. 1 machinery cast.	12.50 to 13.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast....	12.50 to 13.00
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00
Grate bars	9.00 to 9.50
Brake shoes	11.25 to 11.75

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails for mltng...	14.50 to 15.00
Loose sheet clippings..	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	7.00 to 7.50
Machine shop turns...	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	15.50 to 16.00
No. 1 locomotive tires	13.00 to 13.50
Short rails	18.00 to 18.50
Cast iron carwheels..	14.00 to 14.50
No. 1 machinery cast..	15.00 to 15.50
No. 1 railroad cast	14.00 to 14.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Agricult. malleable ..	14.00 to 14.50
Railroad malleable	15.50 to 16.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$12.50 to $13.00
No. 2 hvy. mltng. steel.	11.75 to 12.25
Borings and turnings..	8.75 to 9.25
Long turnings	8.25 to 8.75
Short shov. turnings..	9.50 to 10.00
No. 1 machinery cast..	14.50 to 15.00
Automotive cast	14.50 to 15.00
Hydraul. comp. sheets.	13.25 to 13.75
Stove plate	8.50 to 9.00
New factory bushel....	12.00 to 12.50
Old No. 2 busheling...	8.00 to 8.50
Sheet clippings	9.75 to 10.25
Flashings	12.00 to 12.50
Low phos. plate scrap.	13.50 to 14.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$10.75	$10.50
No. 2 hvy. mltng. steel.	9.75	9.25
Mixed dealers steel	7.75	7.75
Scrap pipe	6.75	6.50
Steel turnings	4.25	4.25
Cast iron turnings	4.75	4.50
Machinery cast	11.75	11.00
Dealers cast	10.75	10.00
Stove plate	7.25	6.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.75 to $17.25
Hydraulic bundles	16.00 to 16.50
Machine shop turn.....	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.00 to $12.00
No. 2 hvy. mltng steel.	9.50 to 10.00
Hvy. breakable cast...	11.00 to 11.50
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	10.50 to 10.75
Stove plate	.... 9.00
Steel car axles	16.00 to 17.00
Shafting	15.00 to 16.00
No. 1 RR. wrought ...	12.00 to 12.50
No. 1 wrought long....	11.00 to 11.50
Spec. iron & steel pipe	10.50 to 11.00
Forge fire	8.00 to 8.50
Rails for rolling	12.00 to 12.50
Short shov. turnings..	6.00 to 6.50
Machine shop turn....	6.00 to 6.50
Cast borings	6.00 to 6.50
No. 1 blast furnace	6.00 to 6.50
Cast borings (chem.)..	10.00 to 11.00
Unprepar. yard scrap.	6.00 to 6.50

Per gross ton, delivered local foundries:

No. 1 machn. cast.....	$14.00 to $14.50
No. 1 hvy. cast cupola.	11.50 to 12.00
No. 2 cast	10.50 to 11.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.15 to $11.65
Scrap rails	11.15 to 11.65
No. 2 steel	9.15 to 9.65
Breakable cast	10.00 to 10.25
Machine shop turn.....	.... 5.90
Unmixed bor. & turn...	.... 5.40
Bund. skeleton long...	10.00 to 10.05
Shafting	15.75 to 16.00
Cast bor. chemical.....	6.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	$13.00 to $13.50
No. 1 machine cast ..	13.00 to 13.50
Stove plate.....	9.50 to 10.00

EXPORT

Dealers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	.... $11.00
No. 2 hvy. mltng. steel.	.... 10.00
No. 2 cast	.... 10.00
Stove plate	.... 9.00
Rails (scrap)	$10.75 to 11.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$12.00 to $12.25
No. 2 hvy. mltng. steel.	11.00 to 11.25
Rails (scrap)	12.50
Stove plate	7.75
Machine shop turn...	6.00 to 6.25

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	$12.60 to $12.75
No. 2 hvy. mltng. steel.	11.60 to 11.75

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to $11.00
Compressed bundles ..	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$32.00 to $34.00
Forging quality	39.00 to 40.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$32.00 to $34.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.80c. to 1.90c.

Wire Rods

(No. 5 to 15/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$43.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	44.00
F.o.b. Worcester, Mass.	45.00
F.o.b. Birmingham	46.00
F.o.b. San Francisco	52.00
F.o.b. Galveston	49.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.05c. to 2.20c.
F.o.b. Chicago or Gary	2.10c. to 2.25c.
F.o.b. Duluth	2.20c. to 2.35c.
Del'd Detroit	2.20c. to 2.35c.
F.o.b. Cleveland	2.10c. to 2.25c.
F.o.b. Buffalo	2.15c. to 2.30c.
Del'd Philadelphia	2.36c. to 2.51c.
Del'd New York	2.40c. to 2.55c.
F.o.b. Birmingham	2.20c. to 2.35c.
F.o.b. cars dock Gulf ports	2.45c. to 2.60c.
F.o.b. cars Pacific ports	2.60c. to 2.75c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	1.90c. to 2.05c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	1.95c. to 2.10c.
F.o.b. Buffalo	2.00c. to 2.15c.
F.o.b. Birmingham	2.05c. to 2.20c.
F.o.b. cars dock Gulf ports	2.30c. to 2.45c.
F.o.b. cars dock Pacific ports	2.45c. to 2.60c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.10c.
Del'd Detroit	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Buffalo, Cleveland Youngstown, Chicago, Gary or Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.35c. to 2.55c.
F.o.b. Cleveland, Chicago and Gary	2.40c. to 2.60c.
F.o.b. Buffalo	2.45c. to 2.65c.
Del'd Detroit	2.50c. to 2.70c.
Del'd eastern Michigan	2.55c. to 2.75c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.90c. to 2.05c.
F.o.b Chicago or Gary	1.95c. to 2.10c.
Del'd Cleveland	2.095c. to 2.245c.
F.o.b. Coatesville or Spar. Pt.	2.00c. to 2.15c.
Del'd Philadelphia	2.09c. to 2.24c.
Del'd New York	2.19c. to 2.34c.
F.o.b. Birmingham	2.05c. to 2.20c.
F.o.b. cars dock Gulf ports	2.30c. to 2.45c.
F.o.b. cars dock Pacific ports	2.45c. to 2.60c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.45c.
F.o.b. Chicago	3.50c.
F.o.b. Coatesville	3.55c.
F.o.b. cars dock Gulf ports	3.85c.
F.o.b. cars dock Pacific ports	4.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.90c. to 2.05c.
F.o.b. Chicago	1.95c. to 2.10c.
Del'd Cleveland	2.095c. to 2.245c.
F.o.b. Buffalo or Bethlehem	2.00c. to 2.15c.
Del'd Philadelphia	2.115c. to 2.265c.
Del'd New York	2.1625c. to 2.3125c.
F.o.b. Birmingham (standard)	2.05c. to 2.20c.
F.o.b. cars dock Gulf ports	2.30c. to 2.45c.
F.o.b. cars dock Pacific ports	2.45c. to 2.60c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.25c. to 2.40c.
F.o.b. Chicago or Buffalo	2.35c. to 2.50c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.70c. to 2.85c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$39.00
Angle bars, per 100 lb.	2.55c. to 2.70c.

F.o.b. Basing Points

	Base per 100 Lb.
Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00
Spikes	2.75c. to 2.90c.
Tie plates, steel	2.00c. to 2.10c.
Tie plates, Pacific Coast ports	2.10c. to 2.20c.
Track bolts, to steam railroads	3.75c. to 4.00c.
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list	

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.15c.
No. 10, f.o.b. Gary	2.25c.
No. 10, del'd Detroit	2.35c.
No. 10, del'd Philadelphia	2.46c.
No. 10, f.o.b. Birmingham	2.30c.
No. 10, f.o.b. cars dock Pacific ports	2.70c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.80c.
No. 24, f.o.b. Gary	2.90c.
No. 24, del'd Detroit	3.00c.
No. 24, del'd Philadelphia	3.11c.
No. 24, f.o.b. Birmingham	2.95c.
No. 24, f.o.b. cars dock Pacific ports	3.45c.
No. 24, wrought iron, Pittsburgh	4.50c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.80c.
No. 10 gage, f.o.b. Gary	2.90c.
No. 10 gage, f.o.b. Detroit	3.00c.
No. 10 gage, del'd Philadelphia	3.11c.
No. 10 gage, f.o.b. Birmingham	2.95c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.40c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.25c.
No. 20 gage, f.o.b. Gary	3.35c.
No. 20 gage, del'd Detroit	3.45c.
No. 20 gage, del'd Philadelphia	3.56c.
No. 20 gage, f.o.b. Birmingham	3.40c.
No. 20 f.o.b. cars dock Pacific ports	3.80c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.40c.
No. 24, f.o.b. Gary	3.50c.
No. 24, del'd Philadelphia	3.71c.
No. 24, f.o.b. Birmingham	3.55c.
No. 24, f.o.b. cars dock Pacific ports	4.00c.
No. 24, wrought iron, Pittsburgh	5.15c.

Electrical Sheets
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.70c.
F.o.b. Gary	3.80c.
F.o.b. cars dock Pacific ports	4.40c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.20c.
No. 20, f.o.b. Gary	3.30c.
No. 20, f.o.b. Birmingham	3.80c.
No. 20, f.o.b. cars dock Pacific ports	3.80c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.95c.
No. 28, Gary	3.05c.
No. 28, cars dock Pacific ports	3.55c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	2.15c.
All widths up to 24 in., Chicago	2.25c.
All widths up to 24 in., del'd Detroit	2.35c.
All widths up to 24 in., Birmingham	2.30c.
Cooperage stock, Pittsburgh	2.25c.
Cooperage stock, Chicago	2.35c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	2.85c.
F.o.b. Cleveland	2.85c.
Del'd Chicago	3.145c.
F.o.b. Worcester	3.05c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

	Pittsburgh and Cleveland	Worcester
Carbon 0.25-0.50%	2.85c.	3.05c.
Carbon .51- .75	3.70c.	3.90c.
Carbon .76-1.00	5.45c.	5.65c.
Carbon Over 1.00	7.50c.	7.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.10c.
No. 14, Worcester	3.50c.
No. 20, Pittsb'gh or Cleveland	3.50c.
No. 20, Worcester	3.90c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Spring wire	3.20c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.25
Smooth coated nails	2.25

	Base per 100 Lb.
Annealed fence wire	$2.80 to $2.90
Galvanized fence wire	3.15 to 3.30
Polished staples	2.95
Galvanized staples	3.20
Barbed wire, galvanized	2.75
Twisted barbless wire	2.75
Woven wire fence, base column	63.00
Single loop bale ties, base column	55.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	57	37	⅛	+91½	+138
¼ to ⅜	60	44½	¼ & ⅜	+1½	+21½
½	64½	55	½	31½	15
¾	67½	59	¾	36½	20½
1 to 3	69½	61½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	62	53½	2	37	22½
2½ to 3.65		56½	2½ to 3½	38	25
3½ to 6.67		58½	4 to 8	40	28½
7 & 8.66		56½	9 to 12	38	24½
9 & 10.65		56			
11 & 12.64		55			

Butt Weld, extra strong, plain ends

⅛	55½	42½	⅛	+13	+45½
¼ to ⅜	57½	46½	¼ & ⅜	+2½	+34½
½	62½	54½	½	32½	17½
¾	66½	58½	¾	37½	22½
1 to 3	68	61	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	60	52½	2	40	26
2½ to 3.64		56½	2½ to 4.45½		33
3½ to 6.67½		60	4½ to 6.45		33½
7 & 8.	66½	57	7 & 8.46		33
9 & 10.	65½	56	9 to 12.41½		30
11 & 12.	64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2¼ in. o.d.	12 B.W.G.	17.61	16.01
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. od.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12½%
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	$50.40
6-in. and larger, del'd New York	48.00
*6-in. and larger, Birmingham	42.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	50.00
F.o.b. dock, Seattle	42.50
4-in., f.o.b. dock, San Francisco or Los Angeles	53.00
F.o.b. dock, Seattle	53.50

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $41, Birmingham, and $49.50, delivered Chicago; and 4-in. pipe, $44, Birmingham, and $52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	70
Larger than ½ in.	65 and 10
Lag bolts	65 and 10
Plow bolts, Nos. 1, 2, 3, and 7 heads	65, 10 and 10
Hot-pressed nuts, blank or tapped, square	65 and 10
Hot-pressed nuts, blank or tapped, hexagon	65 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	65 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 5
Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 5
Stove bolts in bulk	81½

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.25
F.o.b. Chicago or Birmingham	3.35

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base 2.55c. to 2.75c.

Delivered, Detroit 2.70c. to 2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (1½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. to 3.25c. base per lb. Delivered Detroit, 3.20c. to 3.40c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	57½c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15¾c.
Regular	12½c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Based on Exchange rate as of Dec. 1

Ferromanganese, export	$45.58
Billets, open-hearth	29.75 to $31.01
Tin plate, per base box	4.74 to 4.84
Steel bars, open-hearth	39.87
Beams, open-hearth	38.61
Channels, open-hearth	39.87
Angles, open-hearth	38.61
Black sheets, No. 24 gage	61.66
Galvanized sheets, No. 24 gage	61.50

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports

Based on Exchange rate of Dec. 1

Billets, Thomas	$19.27
Wire rods, No. 5 B.W.G.	36.90
Steel bars, merchant	26.64
Sheet bars	19.68
Plate, ¼ in. and up	35.42
Plate, 3/16 in. and 5 mm	34.85
Sheets, ⅛ in.	36.90
Beams, Thomas	25.58
Angles (Basic)	25.58
Hoops and strip base	32.79
Wire, plain, No. 8	44.03
Wire nails	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	71.74

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.15c.
Reinforcing steel bars	3.15c.
Cold-finished and screw stock:	
Rounds and hexagons	3.60c.
Squares and flats	3.60c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops	3.80c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.77
Spikes, large	3.25c.
	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	$3.65
Wire, black, soft ann'l'd, base per 100 lb.	3.15c.
Wire, galv. soft, base per 100 lb.	3.55c.
Common wire nails, per keg	2.50c.
Cement coated nails, per keg	2.50c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.20c.
Soft steel bars, squares and hexagons	3.35c.
Cold-fin. steel bars:	
Rounds and hexagons	3.75c.
Flats and squares	3.75c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.85c.
Track bolts (keg lots)	4.85c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.
	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.95
Com. wire nails, 50 kegs or more	2.50c.†
Cement c't'd nails, 50 kegs or more	2.50c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants wihtin the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.50c.
Structural shapes	3.47c.
Soft steel bars, rounds	3.51c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.06c.
Flats and squares	4.06c.
Cold-rolled; strip, soft and quarter hard	3.86c.
Hoops	3.66c.
Bands	3.66c.
Hot-rolled sheets (No. 10)	3.15c. to 3.41c.
Hot-rolled ann'l'd sheets (No. 24*)	3.75c. to 4.10c.
Galvanized sheets (No. 24*)	4.10c. to 4.50c.
Long terne sheets (No. 24)	5.25c. to 5.35c.
Armco iron, galv. (No. 24†)	5.65c.
Toncan iron, galv. (No. 24†)	5.65c.
Galvannealed (No. 24†)	5.75c.
Armco iron, hot-rolled annealed (No. 24†)	5.10c.
Toncan iron, hot-rolled annealed (No. 24†)	5.10c.
Armco iron hot-rolled (No. 10†)	4.15c.
Toncan iron, hot-rolled (No. 10†)	4.15c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.65c.
Deep drawing	5.40c.
Stretcher leveled	5.40c.
SAE, 2300, hot-rolled	6.97c.
SAE, 3100, hot-rolled	5.37c.
SAE, 6100, hot-rolled, annealed	9.57c.
SAE, 2300, cold-rolled	8.03c.
SAE, 3100, cold-rolled, annealed	7.43c.
Floor plate ⅛ in. and heavier	5.30c.
Standard tool steel	11.25c.
Wire, black annealed (No. 9)	3.50c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ⅛ in. and larger	3.85c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	$3.21
	Per Cent Off List
Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.45c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.60c.
Cold-fin. rounds, shafting, screw stock	4.00c.
Hot-rolled annealed sheets (No. 24)	4.30c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.30c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.25c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller.	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.25c.
‡Reinforc. steel bars, sq. twisted and deformed	3.01c.
Cold-finished steel bars	4.01c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, ¼ in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.41c.
Soft steel bars	3.10c.
‡Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.75c.
Flat-rolled steel under ¼ in.	3.46c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.21c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.46c.
*Black ann'l'd wire, per 100 lb.	$2.80
*No. 9 galv. wire, per 100 lb.	3.15
*Com. wire nails, base per keg	2.25

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Floor plates	5.27c.
Bars, rounds, flats and angles.	3.42c.
Other shapes	3.57c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.97c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more.	3.72c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload.	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.48c.
Struc. shapes	3.35c.
Soft steel bars	3.25c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.80c.
Rounds and hex.	3.80c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.26c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.53c.
Galv. sheet (No. 24)	4.80c.
Bands	3.53c.
Hoops	3.53c.
Heavy top-rolled sheets	3.28c.
Com. wire nails, base per keg	$2.85
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb.
Channels, angles	3.65c.
Tees and zees, under 3"	3.90c.
H beams and shapes	3.64c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.66c.
Floor plates, diamond pattern	5.46c.
Bar and bar shapes (mild steel)	3.65c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.75c. to 4.75c.
Half rounds, half ovals, ovals and bevels	4.90c.
Tire steel	4.90c.
Cold-rolled strip steel	2.45c.
Cold-finished rounds, squares and hexagons	4.15c.
Cold-finished flats	4.10c.
Blue annealed sheets, No. 10 ga.	3.75c.
One pass cold-rolled sheets No. 24 ga.	4.30c.
Galvanized steel sheets, No. 24 ga.	4.30c.
Lead coated sheets, No. 24 ga.	5.95c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.29c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.14c.
Hot-rolled sheets (No. 10)**	3.24c.
Galvanized sheets (No. 24)	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.84c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.

Bolts and nuts, in cases, 70 and 10 per cent off list
Broken cases..65 and 10 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

* Base less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

** Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.31c.
Soft steel bars, squares and hexagons	3.46c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)	3.26c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Galvanized sheets (No. 20)	4.76c.
Cold-finished steel bars	3.76c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	4.01c.
Boiler rivets, cone head (keg lots)	4.11c.
Track spikes (keg lots)	4.06c.
Track bolts (keg lots)	5.06c.
Black annealed wire	3.40c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

	Per Cent Off List
Machine bolts carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.45c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	4.00c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.20c.
Structural shapes	3.10c.
Reinforcing bars	....prices on application
Plates	3.10c.
Hot-rolled sheets, No. 10	3.20c.
Bands	3.30c.
Hoops	3.55c.
Special threading steel	3.20c.
Diamond pattern floor plates ¼ in. and heavier	5.10c.
Galvanized bars and small shapes	5.70c.
Galvanized bands	5.80c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	3.88c.

All prices are for 2000 lb. and more.

For second zone add 10c. per 100 lb. for trucking.

List size extras of Aug. 15, 1935, and cutting extras to be added.

For cold-rolled products, list size extras from Jan. 1, 1936, and cutting extras to be added.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.46c.
Iron bars	3.46c.
Reinforcing bars	3.46c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets No. 10	3.46c.
Hot-rolled annealed sheets, No. 24*	3.41c.
Galvanized sheets No. 24*	3.96c.
Steel bands	3.71c.
Cold-finished bars	4.281c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	3.57c.
Shapes, bar size	3.57c.
Iron bars	3.57c.
Structural shapes	3.77c.
Plates	3.77c.
Hot-rolled sheets, No. 10	3.57c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24	5.07c.
Steel bands	3.82c.
Cold-drawn rounds	4.04c.
Cold-drawn flats, squares, hexagons	6.04c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.45c.
Reinforcing bars	3.50c.
Structural shapes	3.65c.
Plates	3.65c.
Hot-rolled sheets, No. 10	3.65c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.05c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$2.45
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.60c.	3.80c.	3.65c.
Shapes, standard	3.60c.	3.80c.	3.65c.
Soft steel bars	3.60c.	3.80c.	3.90c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.30c.	4.35c.	4.60c.
Hot-rolled sheets (No. 10)	3.70c.	3.90c.	3.85c.
Galv. sheets (No. 24 and lighter)	5.00c.	4.60c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.80c.	5.00c.
Cold finished steel			
Rounds	6.05c.	6.10c.	6.00c.
Squares and hexagons	7.30c.	7.35c.	6.35c.
Flats	7.80c.	7.85c.	7.35c.
Common wire nails—base per keg less carload	$2.90	$2.90	$2.90

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$45.00
High-heat duty, New Jersey	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	40.00
Intermediate, New Jersey	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	$48 to 50.00
Silica cement per net ton	8.00

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.75
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md.	21.50
Delivered Brooklyn	23.9289
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	20.50
F.o.b. Jackson, Ohio	22.25
Delivered Cincinnati	20.82
F.o.b. Duluth	21.00
F.o.b. Provo, Utah	18.50
Delivered San Francisco, Los Angeles or Seattle	23.315
F.o.b. Birmingham*	16.88

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.00
F.o.b. Buffalo	19.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	20.00
Delivered Cincinnati	19.82
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832
F.o b. Jackson, Ohio	21.75
F.o.b. Provo, Utah	18.00
F.o.b. Birmingham	15.50

Bessemer

F.o.b. Everett, Mass.	$23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	22.50
Delivered Boston Switching District	24.00
Delivered Newark or Jersey City	23.9873
Delivered Philadelphia	23.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	21.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	21.00
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.0807
Delivered Canton, Ohio	22.3482
Delivered Mansfield, Ohio	22.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$25.00

Gray Forge

Valley or Pittsburgh furnace	$20.00

Charcoal

Lake Superior furnace	$23.00
Delivered Chicago	26.2528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	$24.00

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$29.00
10.51 to 11.00%	29.50
11.00 to 11.50%	30.00
11.51 to 12.00%	30.50
12.01 to 12.50%	31.00
12.51 to 13.00%	31.50
13.01 to 13.50%	32.00
13.51 to 14.00%	32.50
14.01 to 14.50%	33.00
14.51 to 15.00%	33.50
15.01 to 15.50%	34.00
15.51 to 16.00%	34.50
16.01 to 16.50%	35.00
16.51 to 17.00%	35.50

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	13.00c. to 13.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	27c. to 30c.
Man., African, Indian, 44-48%	25c to 30c.
Man., African, Indian, 49-51%	27c. to 30c.
Man., Brazilian, 46 to 48½%	Nominal..25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	$15.25 to $15.50
Tungsten, domestic, scheelite delivered, nominal	15.00

Per Gross Ton

Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.50 to 17.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic ports	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$19.00
Domestic, barge and rail	19.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	23.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illnois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	5.00c.
Del'd Ch'go, No. 5 industrial	3.77c.
Del'd Cleve'd, No. 3 distillate	6.00c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt	$3.85 to $4.00
Foundry, f.o.b. Connellsville, Prompt	4.25 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	12.00
Foundry, by-product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by-product, Philadelphia	9.85
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

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THIS WEEK'S MACHINE TOOL ACTIVITIES

. . . Price advances bring large volume of new business.

o o o

. . . Automobile companies again active buyers for production lines.

Detroit

THE market for production machinery continues very active, as several of the leading automobile manufacturers are buying equipment to bolster up the lines. Packard continues to be an important factor, and Ford Motor Co. is engaged in a buying program for building up its lines on both the 60 and 85-hp. engines in a volume that has not been seen from this source for a long while. Chrysler is buying a few fill-in machines for its Jefferson Avenue plant, and there is talk of Dodge getting into production on a new cylinder block line; inquiries are already out for a fair portion of this equipment, but final decision on this program is yet to be made. The same situation is true at Plymouth.

Although jobbing tool shops were expected to enter the market in a rather big way in late fall, some hesitancy is now shown in making purchases. These shops have money to spend for new machinery, but they are reluctant to put their reserves into equipment unless the Federal tax law is amended. Large corporation shops, despite millions spent for production machinery, have yet to buy equipment for tool and die rooms. Here lies a large potential market for 1937.

Cleveland

MACHINE tool sales have gained, and the volume of business is very good, particularly for the closing month of the year. Orders are mostly for single machines for replacement purposes. The Cleveland Tractor Co. has purchased 10 or 12 machines. The 10 per cent price advance announced by a local manufacturer of turret lathes and hand screw machines has also been adopted by other manufacturers of these machines. There was a rush to replace orders before this advance became effective Dec. 8. Talk of price advances on other lines of machines evidently is speeding up the placing of orders.

Cincinnati

THE district market moved into greater activity and with definitely strong tone the past week. This was largely due to expanding demand for planers and boring mills, which, coupled with steady ordering of other types of machinery, boosted the sales level. The heavy tool demand, however, is largely from foreign sources, although domestic users indicate an early entry into the market. As a result of improved business, production has been stepped up to about 80 per cent, with at least one planer manufacturer operating full. Delivery on light tools is still a problem, but builders are taking a strong position and promising shipment only in accordance with plant facilities.

Pittsburgh

THE slight slowing up Thanksgiving Day week has disappeared, and the volume of inquiries has not only snapped back to its previous position, but is showing further signs of strength. Orders are being received in satisfactory volume, and dealers are being dogged by their customers every day on the question of delivery. The delivery situation grows more serious, and promises of two months given in one week often change to five months on additional orders for the same equipment before the week is out. Some standard lines cannot be furnished before 14 or 18 weeks, while special orders on which engineering data are required are taking anywhere from seven to eight months. Price increases are taking effect daily. Manufacturers are not waiting until the first of the year, and deadlines have been established from Dec. 4 on, with price increases ranging from 5 to 15 per cent, the latter figure being more in prominence.

Chicago

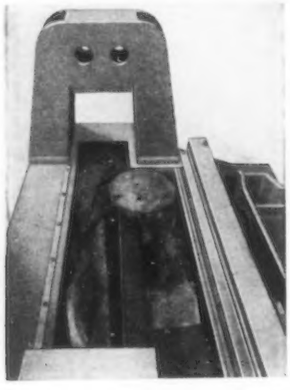
HIGHER prices again come to the fore with announcement by one boring equipment builder that quotations will be advanced Jan. 1, the percentage not being stated. Deliveries are pushing forward, and display floors have been cleared with no possibility of immediate replacements. General interest is on the upgrade. Inquiries are more numerous. Sales dragged last week, but dealers believe the fluctuation to be of no importance. A factor which is holding orders to a good December level is the strong tendency to take inventories as of fiscal rather than the calendar year. This plan is now keeping several farm implement manufacturers in the market. Small machine tools are moving very fast, and used equipment is in brisk demand.

New York

MACHINE tool sellers here report an unusually active December thus far. Orders received up to Dec. 4 in one office amounted almost to two-thirds of the total November business, which was 15 per cent less than that of October, and in nearly all offices, orders have been far above the same time last month. Buying has been diversified and steady. Railroads have not yet been much of a factor, but they are expected soon to enter the market. American Locomotive Co. and American Car & Foundry Co. have recently bought considerable new equipment, a reflection of increased locomotive and car purchases. Deliveries are growing worse, instead of improving, and, as a result, it is practically impossible to secure the better grade second-hand machines.

TRIPLE COMPRESSION

SCRAP BALERS



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and other sizes

Also Regular

Double Ram Presses

in all sizes

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COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

SAVED! $36,229.21 WITH GISHOLT SIMPLIMATICS

Two different sizes were produced by these eight Gisholt Simplimatics: 14"—rate of 28 per hour and 16"—rate of 20 per hour. Note the compact arrangement and small floor space required.

THE ENTIRE INSTALLATION PAID FOR ITSELF IN 14 MONTHS!

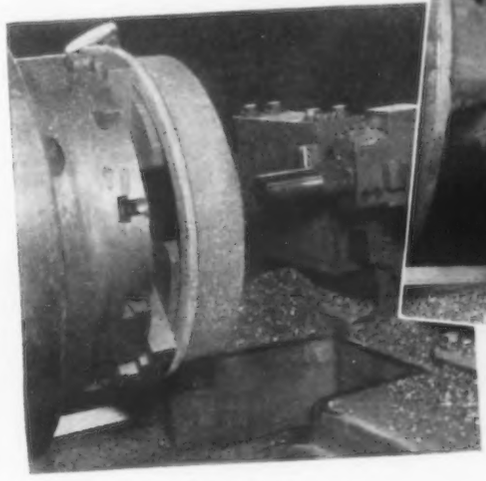
● In one year the eight Gisholt Simplimatics produced 213,113 motor truck brake drums at a saving of 63%.

This remarkable cost reduction was made possible by these outstanding features, combined only in Gisholt Simplimatics:

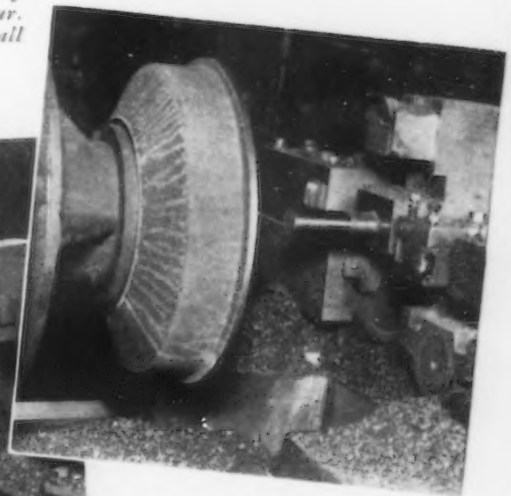
- ★ Designed for simultaneous cutting of all possible surfaces of the piece being machined.
- ★ Heavy, rigid construction to withstand the pressure of multiple tooling without vibration or distortion.
- ★ The operator is entirely relieved of physical effort—one operator usually tends several Simplimatics.
- ★ A simple, heavy-duty, automatic high-production lathe combining dependability with low maintenance cost.

In any highly competitive industry, such production economy is a matter of first importance.

A Gisholt survey may reveal how your work can be handled faster, better and at lower cost. Your request for a Gisholt engineer to call does not obligate you in any way.



In the first operation, the drum is chucked on the rough inside diameter. The hub hole is bored and the back faced. Boring and facing are carried on simultaneously.



In the second operation, the drum is mounted on a fixture, centralizing in the bore and held by air-operated fingers. The braking surface is bored and the flange is turned, faced and chamfered simultaneously.

●

GISHOLT

GISHOLT MACHINE COMPANY

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PLANT EXPANSION AND EQUIPMENT BUYING

. . . Union Bag & Paper Co., New York, has authorized construction of third unit of plant at Savannah, Ga., to cost $3,000,000 complete.

o o o

. . . Ford Motor Co. plans an expenditure of $1,600,000 at branch plant at Windsor, Ont., for additions and equipment.

o o o

. . . Westinghouse Electric & Mfg. Co., East Pittsburgh, has plans for an addition to branch plant at Hamilton, Ont., costing $100,000 with equipment.

NORTH ATLANTIC

Continental Can Co., 100 East Forty-second Street, New York, plans one-story addition to branch plant at Syracuse, N. Y. Cost over $50,000 with equipment.

Edward W. Franco Engineering Corp., 4102 Fifth Avenue, New York, manufacturer of oil burners and oil burning equipment, has acquired building at 332 Ninth Street, and will remodel for plant.

General Electric Co., Schenectady, N. Y., has approved plans for one-story factory branch, storage and distributing plant at Houston, Tex., for which superstructure will begin at once. Cost over $100,000 with equipment.

H. Weinstein Machinery Co., 229 West Twenty-eighth Street, New York, printing machinery and parts, has leased property at 21-07 Borden Avenue, Long Island City, for plant.

United States Industrial Alcohol Co., 60 East Forty-second Street, New York, has filed plans for two-story addition to plant at Curtis Bay, Baltimore, 64 x 95 ft. Cost close to $30,000 with equipment.

Port of New York Authority, 111 Eighth Avenue, New York, has authorized early call for bids for about 52,000 tons of iron rings, for second or Northerly tube of Midtown Hudson tunnel. Cost about $2,640,000.

Pepsi-Cola Co., 47-51 Thirty-third Street, Long Island City, has taken over property at New Orleans for branch mechanical-bottling, storage and distributing plant for beverages. Cost over $150,000 with equipment.

Superior Neon Products Co., 148 West Twenty-third Street, New York, manufacturer of tube lighting equipment, etc., has leased space in building at 136-40 West Twenty-third Street for plant.

Union Bag & Paper Corp., Woolworth Building, New York, has authorized construction of third unit at new kraft pulp and paper mill at Hermitage Plantation, Savannah, Ga. Cost close to $3,000,000 with machinery. George F. Hardy, 309 Broadway, New York, is consulting engineer.

Ruberoid Co., 500 Fifth Avenue, New York, manufacturer of roofing products, has approved plans for one-story addition to branch plant at St. Louis, 80 x 805 ft., to increase present plant capacity about 50 per cent. Cost about $250,000 with machinery. Morris F. Marks, Ambassador Building, St. Louis, is engineer.

Wallace & Tiernan Co., Inc., 11 Mill Street, Belleville, N. J., manufacturer of equipment for water and sewage purification systems, has asked bids on general contract for three one-story additions on site to be vacated by Town Commission, totaling close to 100,000 sq. ft. floor space. Cost about $200,000 with machinery. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Owens-Illinois Glass Co., Ohio Building, Toledo, Ohio, will remodel its former glass works at South Glassboro, N. J., inactive for several years, and will convert plant for production of metal bottle caps and allied specialties. Equipment will be installed for employment of over 200 persons.

Department of Parks and Public Property, Newark Airport Administration, City Hall, Newark, N. J., James W. Costello, chief engineer, has authorized immediate call for bids for one, two and three-story hangar, 213 x 1108 ft., at Newark Airport, including steel framework. Cost about $1,300,000. Financing has been arranged through Federal aid.

Salem County Board of Education, Pennsgrove, N. J., plans manual training department in new two-story and basement central high school at Elmer, N. J. Cost about $230,000. B. H. Edwards, 130 North Broadway, Camden, N. J., is architect.

George W. Baker Machine Co., 218 French Street, Wilmington, Del., manufacturer of machinery and parts, plans rebuilding part of plant recently destroyed by fire. Loss about $75,000 with equipment.

Paragon Steel & Tool Co., East Rutherford, N. J., manufacturer of rock drills, tools, etc., is building an addition containing 4000 sq. ft. of floor space for increase in capacity.

NEW ENGLAND

Arrow-Hart & Hegeman Electric Co., 103 Hawthorne Street, Hartford, manufacturer of electrical products, has asked bids on general contract for five-story addition, 107 x 114 ft. Cost over $100,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are consulting engineers.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Dec. 18 for one motor-driven air compressor (Circular 91).

Security Fence Co., 22 Kent Street, Somerville, Mass., representative for Cyclone Fence Co., Waukegan, Ill., manufacturer of copper-bearing steel fencing, etc., has purchased former No. 1 mill of American Tube Works, 440 Somerville Avenue, for local plant, with department for manufacture of wire, wrought iron and kindred fencing products. William J. Thwing is head.

Wire Rope Corp. of America, Inc., 464 Congress Avenue, New Haven, Conn., will take bids on general contract for two additions to plant, one story, 150 x 150 ft., and two stories, 25 x 60 ft. Cost over $85,000 with equipment. Leo F. Caproni, 742 Elm Street, is architect and engineer.

Ford Motor Co., Dearborn, Mich., has let general contract to Franklin Construction Co., 30 Mystic Avenue, Medford, Mass., for one-story addition to branch assembling works at Somerville, Mass., 240 x 300 ft. Cost close to $175,000 with equipment.

United Liquors, Inc., 12 Lansdowne Street, Boston, has leased one and two-story building at 49-65 Lansdowne Street, 50,000 sq. ft. floor space, for new storage and distributing plant.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Dec. 17 for one motor-driven, deep-well turbine pumping unit with accessories (Proposal 398-48); until Dec. 18, 4454 steel drums for oil and gasoline, each 10-gal. capacity, and for 4454 flexible nozzle tubes (Proposal 398-40); until Dec. 23, automobile parts, including couplings, rivets, welding rods, etc. (Proposal 398-45).

Standard Wholesale Phosphate Co., Mercantile Trust Building, Baltimore, manufacturer of acid products, commercial fertilizers, etc., has asked bids on individual contracts for three-story addition to plant on Curtis Bay, 110 x 450 ft. Cost close to $100,000 with equipment.

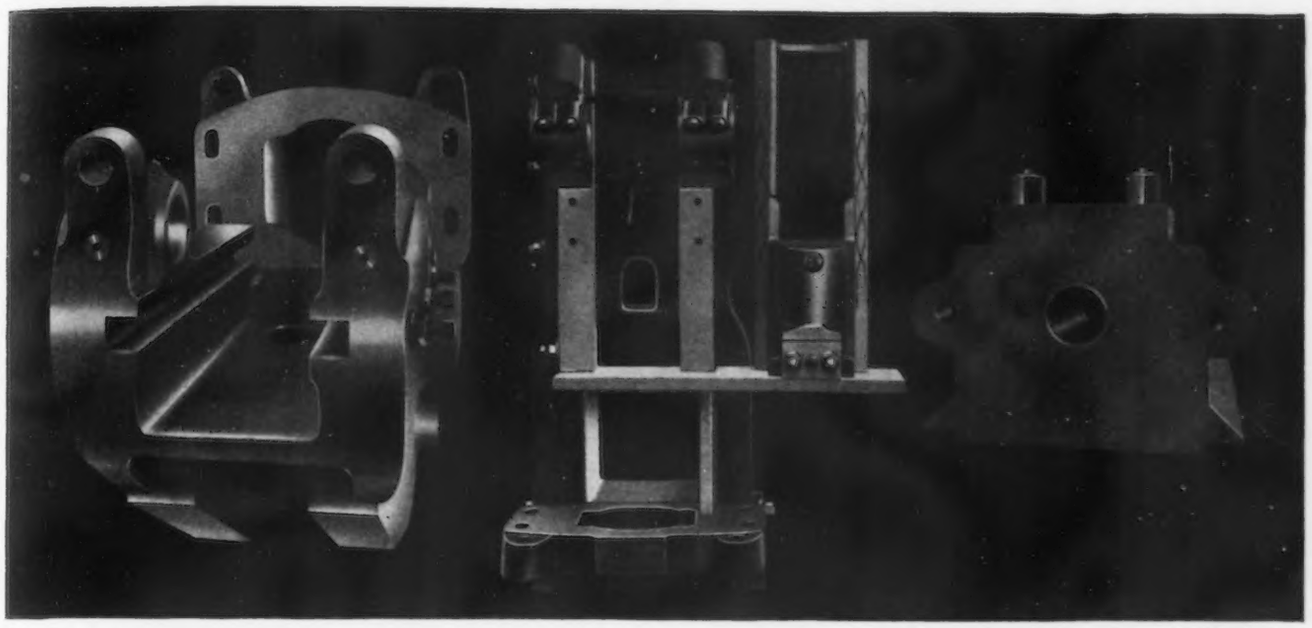
Norfolk & Western Railway Co., N. & W. Railway Building, Roanoke, Va., asks bids until Dec. 16 for following equipment: 2000 carbon steel car axles (Contract Serial AA-692); 4000 one-wear rolled steel wheels (Contract AA-693); couplers and parts (Contract AA-694); about 2500 tons of steel shapes, plates and bars (Contract AA-695); New Century switchstands and parts (Contract AA-696); 2000 cast steel draft yokes (Contract AA-697); 4000 cast steel side frames (Contract AA-698); 2000 cast steel truck bolsters (Contract AA-699); 1990 cast steel combined striker and front draft lugs (Contract AA-700); 13,000 miscellaneous steel castings, including body side bearings, push pole pockets, body center plates and end door hinges (Contract AA-702). Clyde Cooke is purchasing agent.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 14 for 50,000 ft. wire rope, 10,000 ft. $\frac{5}{8}$-in. steel guy rope, 3000 ft. $\frac{3}{8}$-in. and $\frac{1}{2}$-in. wire rope, 92,000 lb. common wire nails, 2000 lb. galvanized common wire nails, 1000 lb. copper wire slating nails, copper wire, bare resistance wire, power and lighting cable, copper connecting wire, phosphor bronze wire, malleable iron pipe fittigns, brass or bronze pipe fittings, angle valves, globe valves, unions, electric motors, current transformers, rigid steel conduit, copper tubing, watthour meters and other equipment (Schedule 3200).

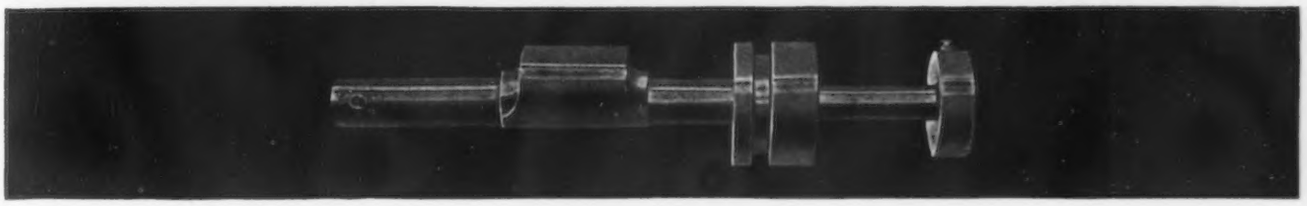
SOUTH ATLANTIC

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 8 for spare parts for airplanes for

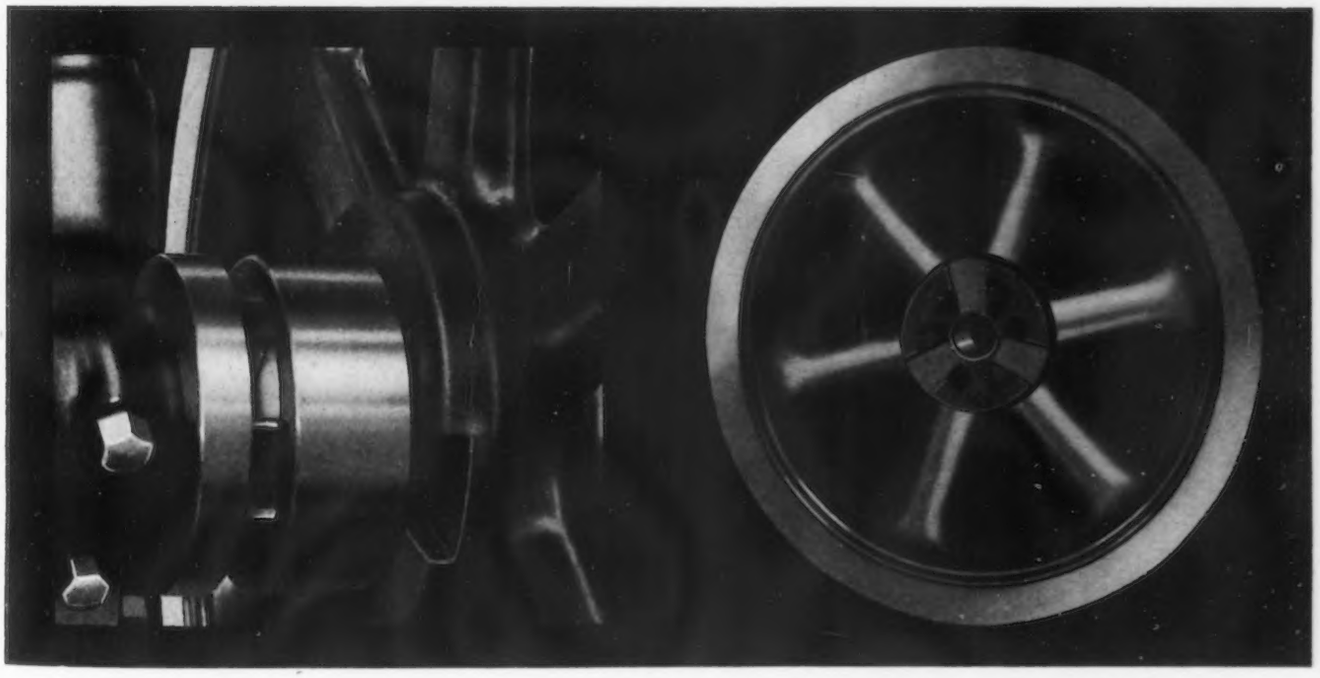
(CONTINUED ON PAGE 120)



Top View, showing unusually long ways. Nearly twice the usual length of slide bearing. Bottom view of slide, showing ears.



Eccentric-type shaft.



Note positive stop recess in shaft. Flywheel. Note large diameter of hub.

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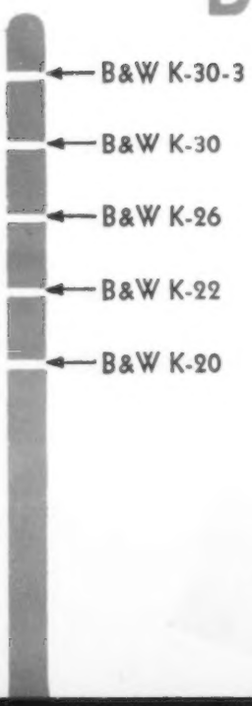
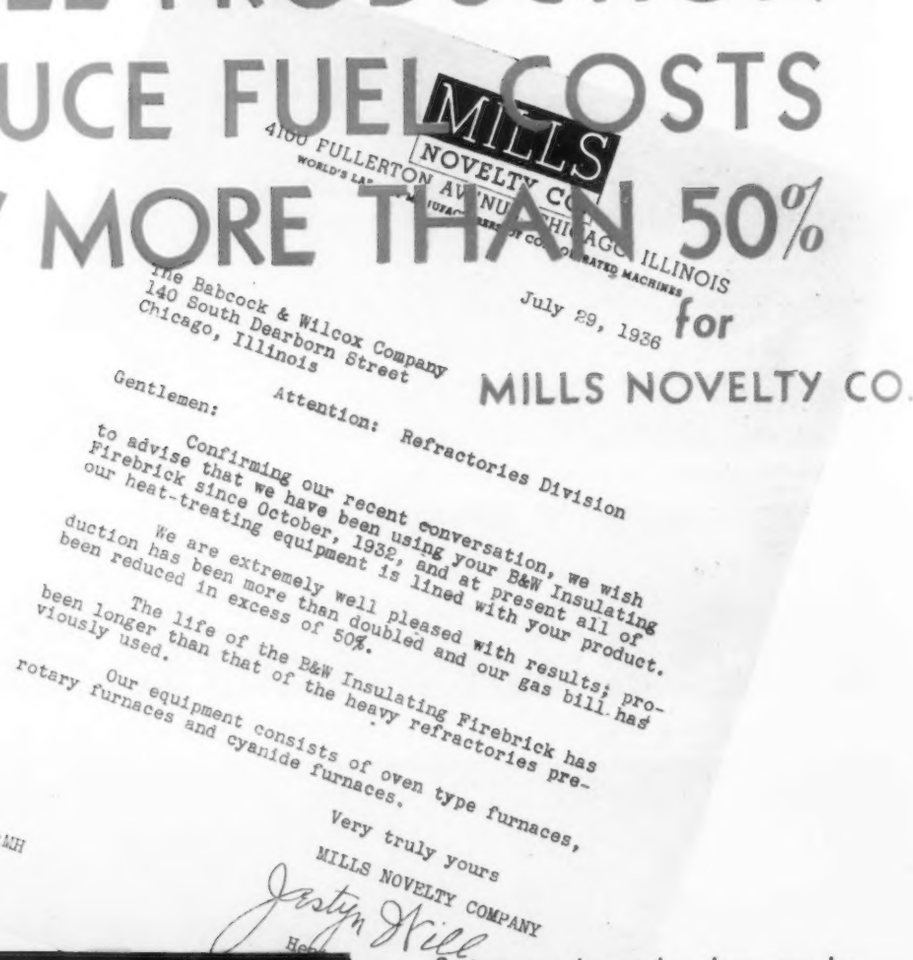
ELLIOTT & STEPHENS MACHINERY CO.. St. Louis
D. S. MAIR MACHINERY CORP.. Houston and Dallas
TIDEWATER SUPPLY CO.. Norfolk, Va.; Columbia, S. C.; Asheville, N. C.
MEYER MACHINERY CO. - Los Angeles, Calif.
ARTHUR JACKSON MACHINE TOOL CO.. Montreal and Toronto

BABCOCK & WILCOX INSULATING FIREBRICK

DOUBLE PRODUCTION— REDUCE FUEL COSTS BY MORE THAN 50%

for MILLS NOVELTY CO.





MILLS NOVELTY CO.
4100 FULLERTON AVENUE CHICAGO, ILLINOIS

July 29, 1936

The Babcock & Wilcox Company
140 South Dearborn Street
Chicago, Illinois

Attention: Refractories Division

Gentlemen:

Confirming our recent conversation, we wish to advise that we have been using your B&W Insulating Firebrick since October, 1932, and at present all of our heat-treating equipment is lined with your product.

We are extremely well pleased with results; production has been more than doubled and our gas bill has been reduced in excess of 50%.

The life of the B&W Insulating Firebrick has been longer than that of the heavy refractories previously used.

Our equipment consists of oven type furnaces, rotary furnaces and cyanide furnaces.

Very truly yours
MILLS NOVELTY COMPANY

LGR:MH

COMPARATIVE OPERATING DATA ON OVEN-TYPE HEAT-TREATING AND CARBURIZING FURNACE

Mills Novelty Company — Chicago, Illinois

Inside Dimensions: 42 in. wide x 72 in. long x 20 in. high above hearth.
Fuel: Gas having a calorific value of 800 B. t. u. per cu. ft.
Operating Temperature: 1600 deg. fahr. Average Charge: 8000 lb.

	FIREBRICK LINING 4½" Firebrick and 2½" Insulating Brick	B&W IFB LINING 4½" B&W IFB and 2½" Insulating Brick	SAVINGS
Time required to reach operating temperature.	240 minutes	45 minutes	81.2%
Fuel required to reach operating temperature.	3,750 cu. ft.	760 cu. ft.	79.7%
Time required to complete cycle with full load.	390 minutes	210 minutes	46.2%
Fuel required for complete cycle with full load.	7,800 cu. ft.	3,300 cu. ft.	57.7%

Savings as substantial as these may be effected in your industrial furnace operating costs . . simply by replacing firebrick or heavy insulating firebrick constructions with B&W Insulating Firebrick.

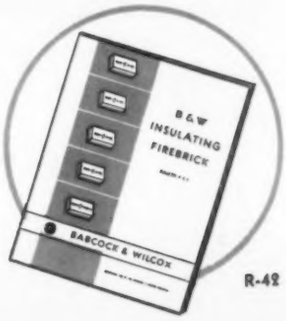
These insulating firebrick have the lowest heat storage and the highest thermal efficiency consistent with the refractoriness requisite to stability in service and long life.

Write for a new fully-illustrated booklet containing a valuable table of heat flows and heat storage capacities for various wall constructions.

BABCOCK & WILCOX

85 LIBERTY STREET . . . NEW YORK . . . N. Y.

Write for this new booklet



R-42

THESE TWO CAN'T BE FOOLED

NOTHING LESS THAN A SUFFICIENT RANGE OF *Live Action* CAN COMBAT THE FORCES OF WEAR AND VIBRATION . . .

Theories may sound good but it takes action . . . *Live Action* to keep machinery tight! No bolt or nut ever loosened *initially* from vibration or shock because it *turned backwards* upon its threads. The friction and adhesion in the threads is infinitely more than enough to resist backward turning due to vibration and shock so long as the *pressures* set up by the wrenching in the original assembly *are maintained.* Only a SPRING WASHER *can do this.*

There is no substitute for a spring washer

SPRING WASHER INDUSTRY
616 WRIGLEY BUILDING, CHICAGO, ILL.

ONLY A SPRING WASHER HAS Live Action!

(CONTINUED FROM PAGE 116)

Naval Air Station, Pensacola, Fla. (Schedule 900-257).

Kieckhefer Container Co., West Canal Street, Milwaukee, manufacturer of corrugated board containers, has taken option on 75-acre tract on Roanoke and Middle Rivers, near Plymouth, N. C., for new pulp and board mill, with power house, pumping station and other mechanical departments. Cost close to $1,000,000 with equipment. Company operates a large paper-converting plant at Delair, N. J. It is affiliated with Eddy Paper Corp., Three Rivers, Mich.

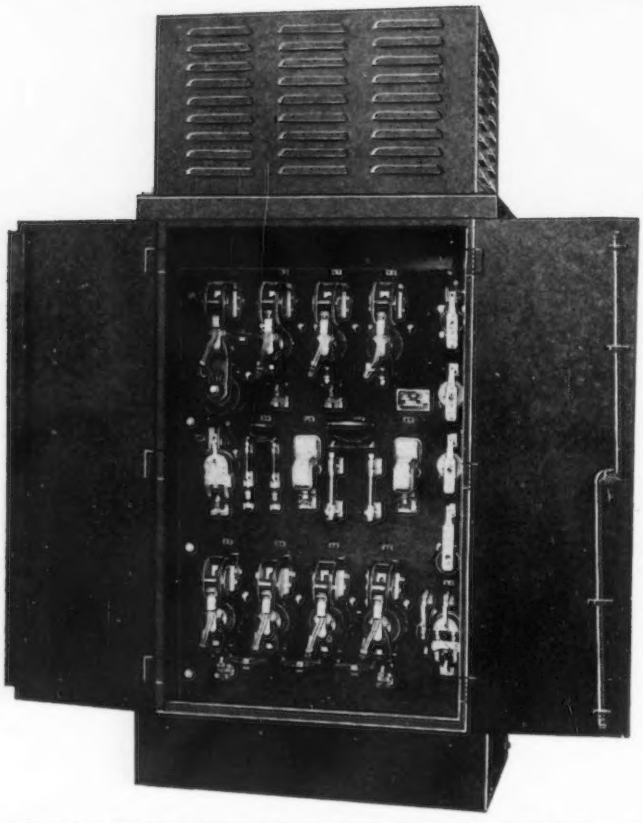
City Council, High Point, N. C., plans new municipal hydroelectric generating plant on Yadkin River, where site has been selected about 12 miles from Winston-Salem, N. C. Project will include power substation and switching station, with transmission line to city limits. Cost about $6,000,000, of which $2,555,000 has been secured through Federal grant.

BUFFALO DISTRICT

National Aniline & Chemical Co., Abbott Road, Buffalo, manufacturer, has filed plans for one-story addition to factory building No. 24. Cost over $45,000 with equipment.

Genesee Brewing Co., 100 National Street, Rochester, N. Y., will begin superstructure soon for one-story addition, for which general contract recently was let to John B. Pike & Son, Inc., 1 Circle Street. Cost close to $50,000 with equipment.

Clark-Sundh



CLARK SPECIAL FULL AUTOMATIC, REVERSING, DYNAMIC BRAKING, FULLY ENCLOSED MAGNETIC CONTROL PANEL

For use with a 50 H.P., 230 Volt, D.C. Motor operating a Strip Coiler with indexing feature.
Note the sturdy construction throughout, including the heavy sheet steel cabinet.
The Clark Edgewound Resistors are mounted in louvered enclosure on top of main cabinet.

THE CLARK CONTROLLER CO.
1146 East 152nd St.
CLEVELAND, OHIO

Du Pont Rayon Co., River Road, Buffalo, manufacturer of cellulose rayon products, has begun construction of one-story addition to local mill, scheduled for completion next March. Cost over $200,000 with machinery.

WESTERN PA. DIST.

Lord Mfg. Co., 1316 Holland Street, Erie, Pa., manufacturer of mechanical rubber products, has plans for new one-story plant on West Twelfth Street, 150 x 250 ft. Cost close to $90,000 with equipment.

Center Foundry & Machine Co., Wheeling, W. Va., manufacturer of iron castings, etc., has plans for one-story addition to plant at Warwood, W. Va. Cost about $30,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has plans for one-story addition to branch plant at Hamilton, Ont., 85 x 250 ft., operated by Canadian Westinghouse, Ltd. Cost close to $100,000 with equipment. Hutton & Souter, Piggott Building, Hamilton, are architects.

SOUTHWEST

Grasselli Chemical Co., 112 West Ferry Street, St. Louis, has let general contract to Schnur-Miller Construction Co., 119 North Seventh Street, for two one-story additions, and improvements in present plant. Cost over $65,000 with equipment.

Franklin County Highway Department, Court House, Kansas City, Mo., Alexander Sachs, highway engineer, has plans for one-story addition to equipment repair, storage and distributing plant, including garage and service unit, at Independence, Mo. Cost about $100,000 with equipment, of which about $45,000 has been secured through Federal grant. David F. Wallace and M. Dwight Brown, West Tenth Street, Kansas City, are architects.

United States Engineer Office, Manufacturers' Exchange Building, Kansas City, Mo., asks bids until Dec. 21 for 210,000 ft. of ⅜-in. diameter galvanized wire strand rope (Circular 260).

Swift & Co., Union Stock Yards, Chicago, meat packer, has asked bids on general contract for extensions and improvements in branch plant at St. Joseph, Mo Cost over $50,000 with equipment.

International Harvester Co., 606 South Michigan Avenue, Chicago, has acquired property adjoing branch plant at Navigation and Lockwood Streets, Houston, Tex., for addition, to cost close to $100,000 with equipment.

SOUTH CENTRAL

Firestone Tire & Rubber Co., Akron, Ohio, has purchased former plant of Murray Wood Products Co., Memphis, Tenn., and will remodel for branch mill for production of tires, with initial capacity of about 500 tires per day, to be increased later to about 2000 tire units daily. Cost close to $100,000.

Dr. Pepper Bottling Co., Inc., 1023 Burgundy Street, New Orleans, manufacturer of beverages, has let general contract to William Wallace, 131 North Jefferson Davis Parkway, for one-story mechanical-bottling plant, 63 x 130 ft. Cost over $50,000 with equipment. E. K. Strahan, 617 Julia Street, is engineer.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Dec. 15 for one 50,000-gal. elevated steel tank and tower for Hiwassee Dam.

Chamber of Commerce, New Iberia, La., is at head of project to build new cooperative sugar mill in New Iberia Parish, with storage and distributing building, power house, machine shop and other mechanical departments. Cost about $400,000 with machinery. Leon Landry is head of committee in charge.

City Council, Fulton, Ky., plans installation of two diesel engine units and auxiliary equipment in waterworks pumping station, and will ask bids soon.

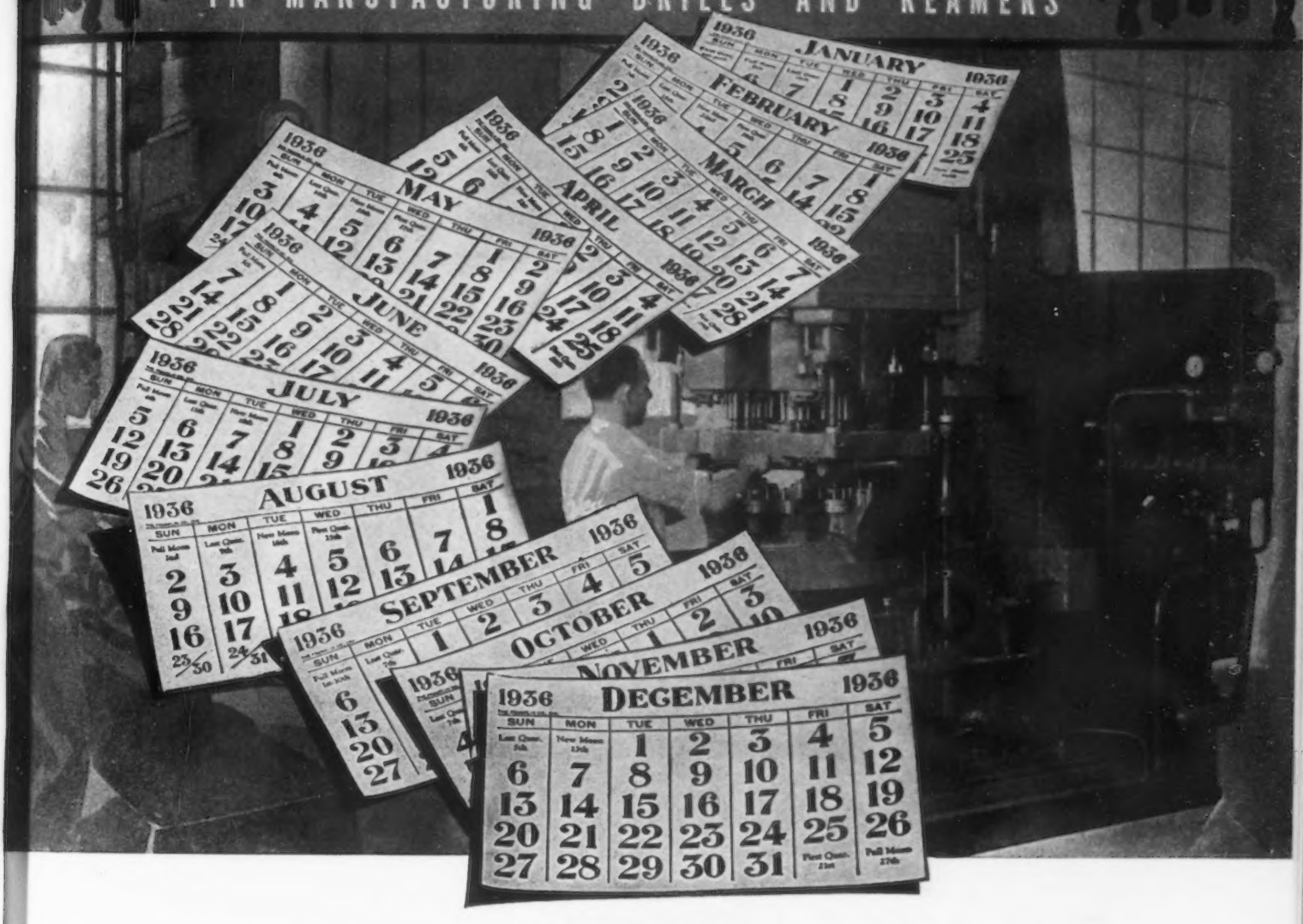
OHIO AND INDIANA

Cleveland Cap Screw Co., 2921 East Seventy-ninth Street, Cleveland, has asked bids on general contract for one-story addi-

(CONTINUED ON PAGE 124)

PROGRESS

IN MANUFACTURING DRILLS AND REAMERS



TO MANY THOUSANDS, 1936 HAS BEEN ANOTHER *Good* "CLEVELAND" YEAR

. . . . and the main purpose of this December advertisement is to say to each of the thousands "thank you" with sincere appreciation. No matter how speedily time travels, the passing of a twelve-month is always an event . . . even when a firm can look back over 60 of them, as "Cleveland" can.

As you plan for maximum savings next year on your heavy investment in modern, high-speed multiple drilling machines, remember the vital necessity for trustworthy small tools to stabilize big volume, *accurate* operations.

"Cleveland's" outstanding progress in research has for years *anticipated* each major development in metals and alloys. The counsel of *men who know* are at your service in meeting your own particular problems, without obligation.

The CLEVELAND TWIST DRILL COMPANY
1242 EAST 49th STREET
CLEVELAND

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

30 READE ST. NEW YORK · 9 NORTH JEFFERSON ST. CHICAGO · 654 HOWARD ST. SAN FRANCISCO
6515 SECOND BLVD., DETROIT · LONDON - E. P. BARRUS, LTD. - 35-36-37 UPPER THAMES ST., E.C.4

"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

CASE STUDY No. 144

FORBES MODERNIZATION CONTEST

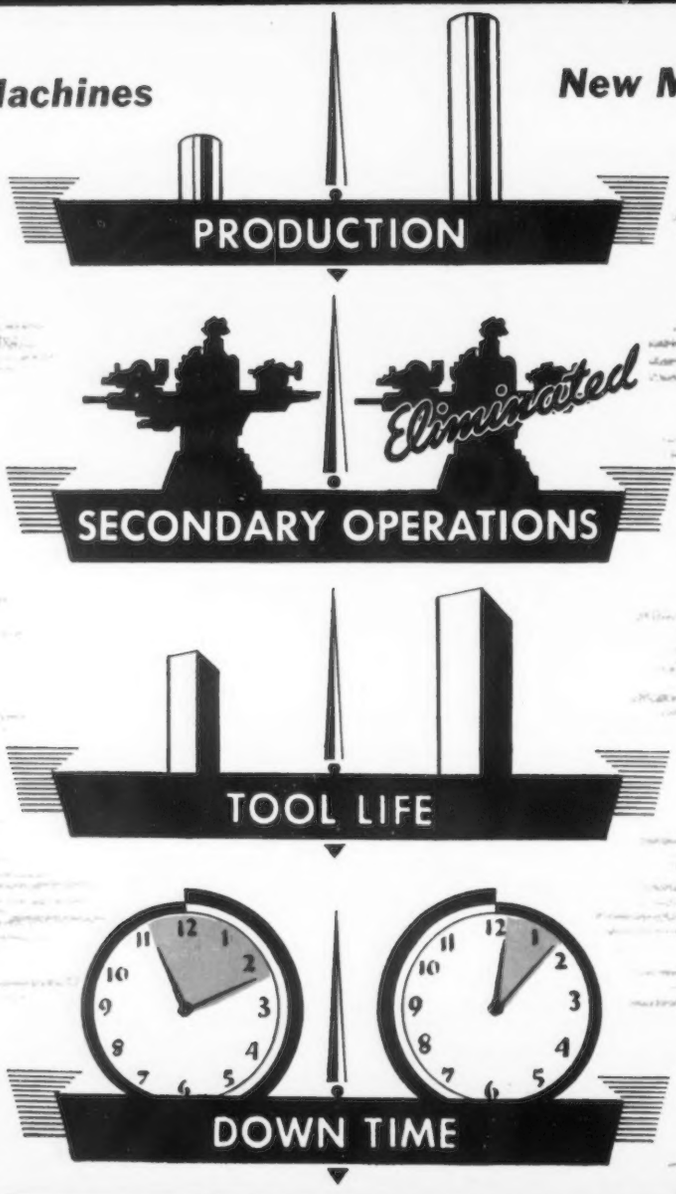
FIRST PRIZE

UP

INTERNATIONAL BUSINESS MACHINES CORP.

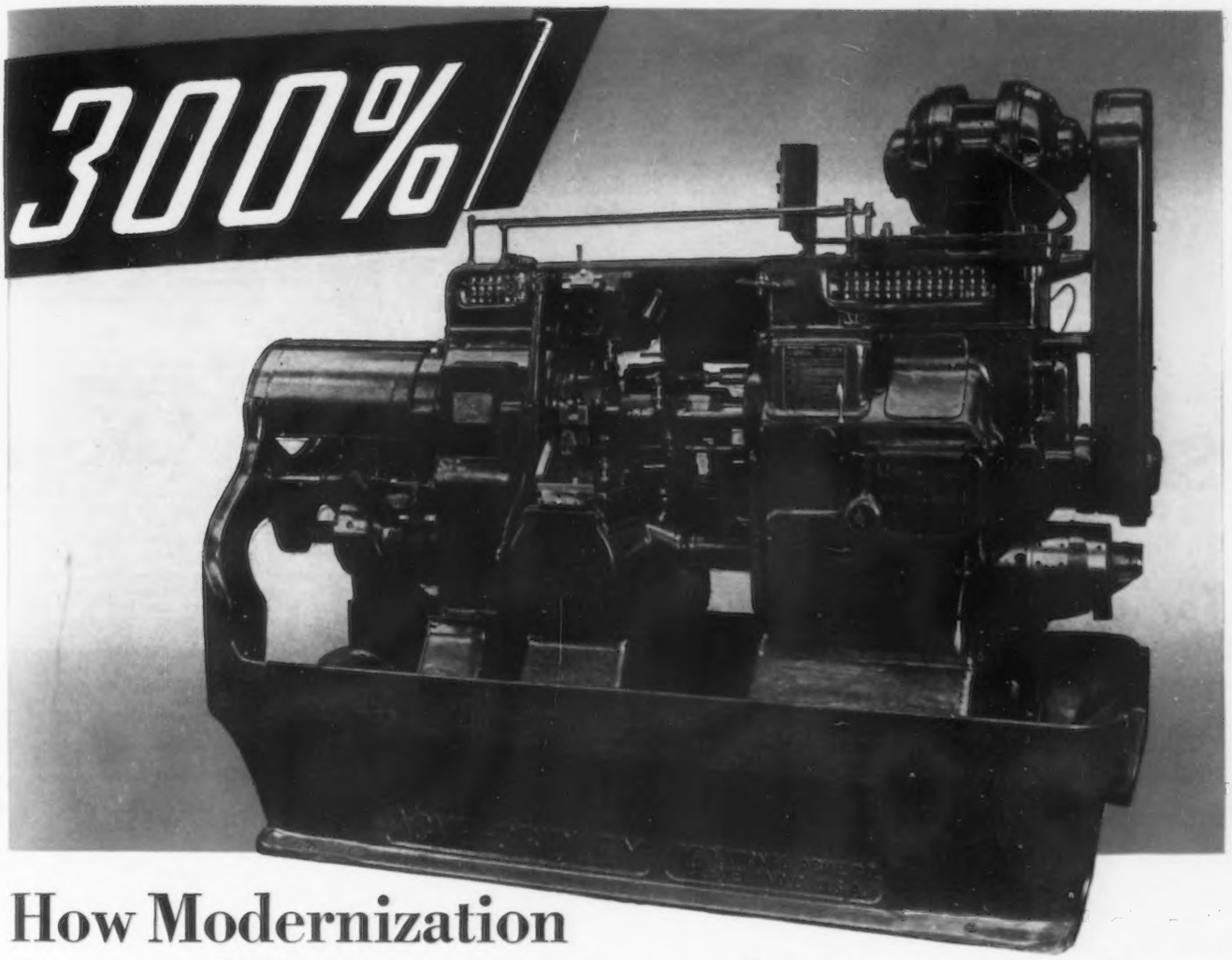
Old Machines

New Machines



Automatic Screw Machines
Dies and Taps
Positive Centrifuges
The Chronolog
Contract Manufacturing

NATIONAL



How Modernization Contest Winner *Cut Screw Department Costs*

FIRST prize winner in the Forbes Magazine Modernization Contest was International Business Machines Corp. This company's modernization program has resulted in improved quality, increased production and lower costs. *Much of the new equipment replaced machines which were still giving satisfactory service.*

Modernization in the automatic and hand screw machine department has established new records in production. With the use of the most improved bar stock and modern tooling, cutting speeds as much as two-and-one-half to three times greater are possible. New machines were purchased to utilize these finer steels with the result that production in this department has been upped nearly three hundred per cent.

National Acme Automatic Screw Machines in use in this plant also insure more uniform quality, greater tool life and reduce down time. In producing magnet cores made from Norway Iron, an expensive secondary grinding operation has been entirely eliminated.

Perhaps *your* screw machines can profitably be replaced. Our engineers will be glad to make a study and submit recommendations. There is no charge or obligation.

The National Acme Company, *Cleveland, Ohio*

NATIONAL

REG. U.S. PAT. OFF.

How Modernization Pays

Despite economic uncertainty the International Business Machines Corporation has always carried out an aggressive modernization program. To attest the soundness of this policy, during the past year and a half of its modernization campaign, this company has been able to raise wages of its factory employees and at the same time reduce production costs.

ACME

GRIDLEY AUTOMATICS

(CONTINUED FROM PAGE 120)

tion, 80 x 200 ft. Cost over $60,000 with equipment. H. M. Morse, 1500 Superior Avenue, is engineer.

Joyce-Cridland Co., North Findlay Street, Dayton, Ohio, manufacturer of automobile jacks, hydraulic jacks and kindred products, plans one and two-story factory on East First Street, 100 x 290 ft. Cost over $100,000 with equipment.

Newburg Steel Co., Kinsman Road, S.E., and East Eighty-first Street, Cleveland, steel jobber, has leased about 10,000 sq. ft. floor space in building at Euclid Avenue and London Road, N.E., for storage and distributing plant.

Ridge Tool Co., Ridge Road, North Ridgeville, Ohio, manufacturer of tools and kindred mechanical equipment, has let general contract to T. J. Hume, 435 Hamilton Avenue, Lorain, Ohio, for one-story addition. Cost about $30,000 with equipment.

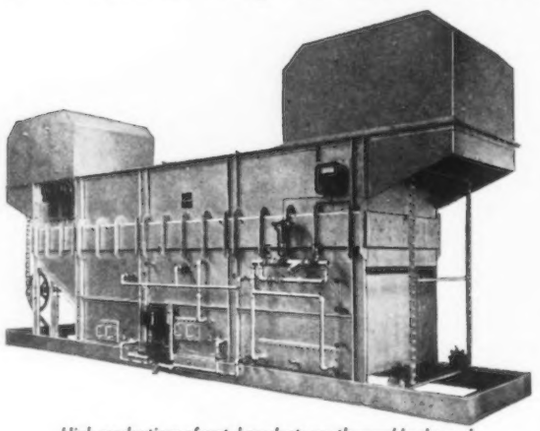
Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 14 for accelerometer assemblies in lots of 105 to 135 (Circular 361); until Dec. 15, bomb rack gear assemblies, bomb rack solenoid latches, bomb rack solenoid assemblies, flare safety catch springs, bomb release indicator solenoid assemblies, bomb hoist unit assemblies, and brake lever assemblies (Circular 359).

Garford Corp., Marion, Ind., operating at former local plant of Indiana Motors Corp., taken over at time of organization to manufacture motor trucks and parts, commercial trailers, etc., has arranged for stock issue to total over $1,000,000, considerable part of fund to be used for plant improvements and purchase of new machinery. Company is planning for 1937 production schedule to include 6000 new light type four-cylinder motor trucks, and 1000 commercial trailers, also parts for trucks.

SCIENTIFIC CLEANING

for the Metal Finishing Industries

Economy, speed, and efficiency in all industrial cleaning operations are assured by Detroit-Rex complete metal cleaning service.



High productions of metal products are thoroughly cleaned in this mammoth, conveyorized 3-dip Detrex Degreaser.

DEGREASERS

Detrex Degreasing . . . the simplest and most rapid method of removing oil and grease from all kinds of metal products prior to rust-proofing, finishing, inspection, or heat treating. . . . Found indispensable by manufacturers of all kinds of metal products.

Complete line of standard and special models ranges from small, hand-operated units, to large completely automatic, conveyorized machines. Available in any combination of vapor, liquid immersion, and hot solvent spray.

SAFETY SOLVENTS

Perm-A-Clor or Triad—the non-inflammable and non-explosive safety solvents—are used in Detrex Degreasers. Both of these solvents have the same cleaning properties, but Perm-A-Clor is the most highly stabilized solvent on the market.

ALKALI CLEANING COMPOUNDS

Triad Alkali Cleaning and Stripping Compounds are scientifically prepared for specific applications. They have the penetration, wetting action, emulsifying power, and free rinsing qualities so essential to efficiency.

Their effective cleaning at low alkalinity makes for safety, the dangers of caustic burns and excessive foaming being eliminated. They are guaranteed to reduce costs or produce better results to your own satisfaction.

Write for new booklet entitled "Scientific Metal Cleaning"

DETROIT REX PRODUCTS COMPANY

Metal Cleaning Specialists

13015 HILLVIEW AVENUE, DETROIT, MICHIGAN

New York Office: 130 W. 42nd St. Chicago Office: 201 N. Wells St.

MICHIGAN DISTRICT

Armour & Co., Union Stock Yards, Chicago, will begin superstructure soon for new one-story branch meat-packing plant at Grand Rapids, Mich., for which general contract recently was let to Owen-Ames-Kimball Co., Grand Rapids. Cost about $65,000 with equipment.

Wolverine Tube Co., 1411 Central Avenue, Detroit, manufacturer of seamless brass and copper tubing, pipe bends, etc., has let general contract to Cooper-Little Co., Maccabees Building, for one-story addition. Cost over $45,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, are architects and engineers.

Garrard Foundry Co., Holland, Mich., recently organized by James G. Garrard, formerly connected with Western Steel Foundry Co., Muskegon, Mich., and associates, has acquired local plant of Manufacturers' Foundry Co. and will remodel. Company will specialize in production of gray iron and alloy castings.

Ford Motor Co., Dearborn, Mich., has plans for one-story additions to branch plant at Windsor, Ont., operated by Ford Motor Co. of Canada, Ltd., for parts production and assembling. Work will begin early in January and is scheduled for completion in about 12 months. Cost close to $1,600,000, of which over $1,000,000 will be expended for equipment. Company has also begun improvements in branch assembling plant, Pittsburgh, closed since 1932, and will install considerable new equipment. Operations will be resumed soon for assembling of 1937 model cars.

MIDDLE WEST

Armstrong-Blum Mfg. Co., 339 North Francisco Avenue, Chicago, manufacturer of hack saws, hack saw blades, metal band saws, shears, etc., has let general contract to Albert S. Low, 510 North Dearborn Street, for one-story plant at 5704-34 Bloomingdale Avenue, 137 x 261 ft. Cost over $100,000 with equipment. W. H. Farnum, 510 North Dearborn Street, is architect.

Minneapolis-Moline Power Implement Co., Minneapolis, manufacturer of agricultural implements and parts, has begun construction of one-story factory branch, storage and distributing plant, 90 x 130 ft., at Des Moines, Iowa, for which general contract recently was let to Roy Anderson, 4229 Hickman Street, Des Moines. Cost about $40,000 with equipment.

Webster Mfg. Co., 1856 North Kostner Street, Chicago, manufacturer of power transmission equipment, elevating and conveying machinery, etc., has arranged for long-term lease of one-story factory, 125 x 325 ft., to be erected at 5622 Bloomingdale Avenue by Phipps Industrial Land Trust, Chicago. General contract has been let to Campbell, Lowrie & Lautermilch Corp., 400 West Madison Street. Cost close to $200,000 with equipment.

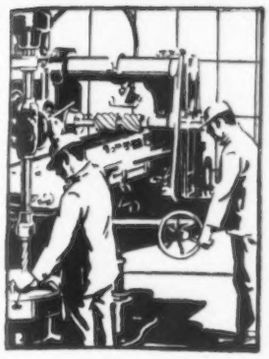
Ray Electrical Mfg. Co., Clary Street, Beloit, Wis., manufacturer of electrical equipment, has plans for new one-story plant, 80 x 165 ft., at South Beloit, Ill., with two smaller one-story units adjoining. Cost close to $45,000 with equipment.

PACIFIC COAST

Crown Willamette Paper Co., 343 Sansome Street, San Francisco, has let general contract to Austin Co., Seattle, for two-story addition to mill at Camas, Wash., 100 x 200 ft., for production of wrapping, kraft paper and other paper tocks. Cost about $85,000 with equipment.

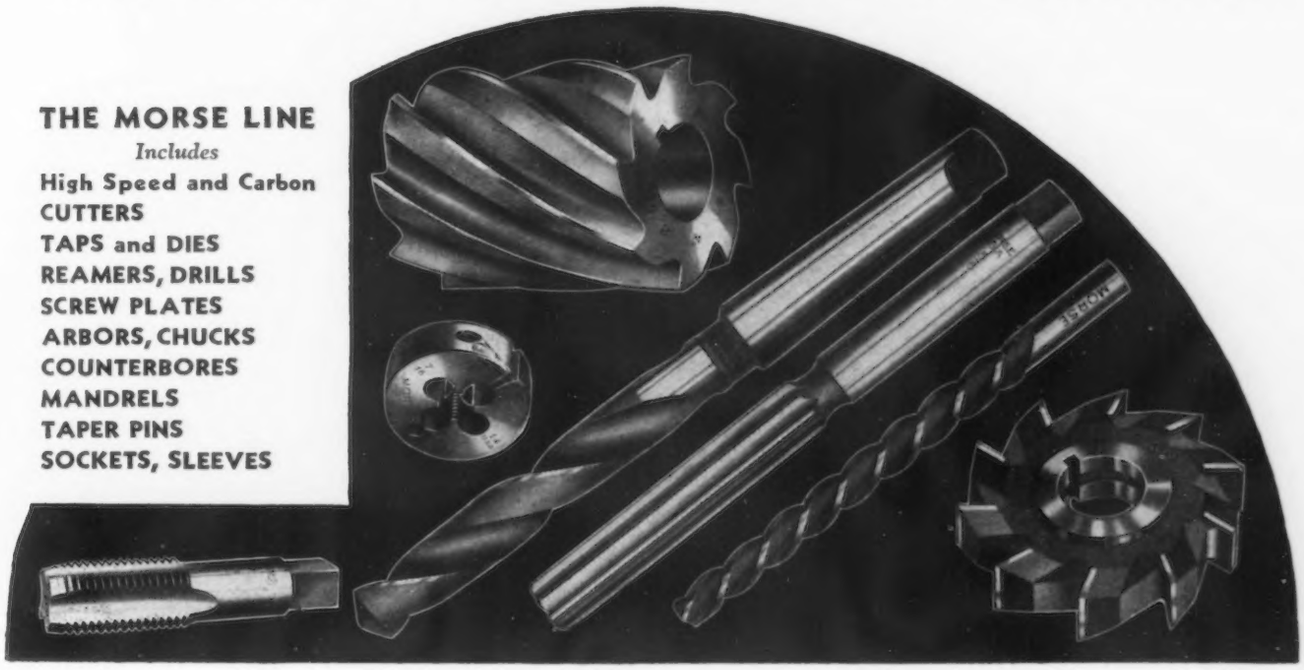
Moore Dry Dock Co., Oakland, Cal., has plans for one-story structural shop at shipbuilding and repair plant. Cost about $50,000 with equipment.

National Ice & Cold Storage Co., 3115 Twelfth Street, Riverside, Cal., has plans for two-story addition to mechanical precooling plant. Cost about $80,000 with machinery.



THE PIECE-WORKER KNOWS THERE IS A DIFFERENCE

THE MORSE LINE
Includes
High Speed and Carbon
CUTTERS
TAPS and DIES
REAMERS, DRILLS
SCREW PLATES
ARBORS, CHUCKS
COUNTERBORES
MANDRELS
TAPER PINS
SOCKETS, SLEEVES



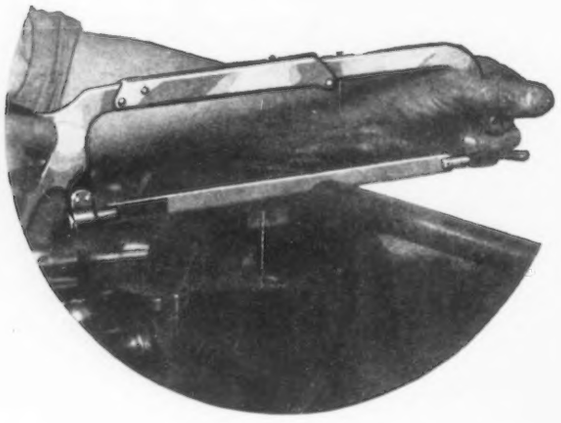
One of the greatest unofficial testers of small tools is the piece-worker. His pay envelope is a reliable indicator of how well the cutting tool is standing up—how rapidly and economically it is performing.

Piece-workers know that there is a difference in small tools. The fact that they so frequently insist on Morse Tools is one of the sincerest tributes which industry can pay to Morse quality. It is proof positive that you can count on steady production, fewer delays, longer working life from Morse cutters, reamers, drills, taps and dies.

There is a Morse Distributor convenient to you

MORSE
TWIST DRILL & MACHINE COMPANY
NEW BEDFORD - - - MASS., U. S. A.

NEW YORK STORE: 130 LAFAYETTE STREET - - CHICAGO STORE: 570 WEST RANDOLPH STREET



Spot Proof...

All the flowery speeches, sensational claims regarding the merits of any tool are worthless unless that tool can stand up "under fire". Atkins Silver Steel Hacksaw Blades for 11 years have led in hacksaw cutting under strenuous factory conditions.

For instance: A piece of 3140 S.A.E. die block steel 5 1/8" x 4 1/2" was cut in 6 minutes with a 14" x 1 1/4" .065 ga. 4 tooth Atkins Silver Steel Power Blade with only .001" variation in thickness from end to end.

That's why Atkins guarantees its famous Blue End Hacksaw Blades, for both power and hand use, to cut more metal . . . faster . . . easier and better than any hacksaw blade on the market.

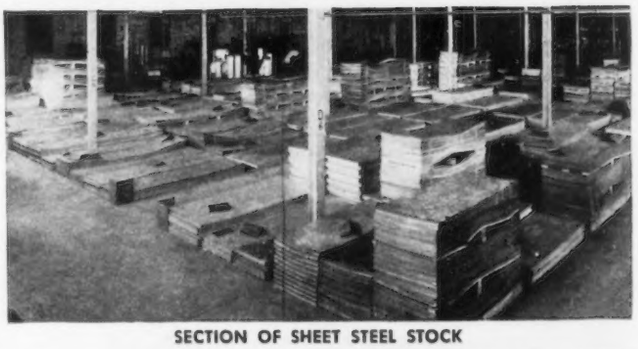
Ask for free Saws in Shop catalog.

E. C. ATKINS AND COMPANY
406 SO. ILLINOIS STREET
INDIANAPOLIS, INDIANA

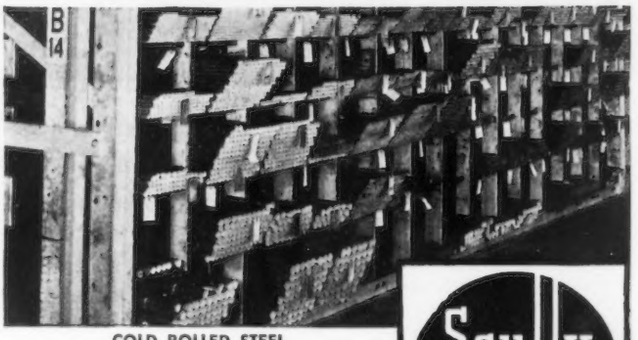
ATKINS *Silver Steel* SAWS
A FAMILY OF CHAMPIONS

EVERYTHING IN
STEEL
FROM STOCK IN EIGHT WAREHOUSES
Phone, wire or mail your order—we'll
SHIP IT THE SAME DAY

STRUCTURAL



SECTION OF SHEET STEEL STOCK



COLD ROLLED STEEL

Use warehouse nearest you—

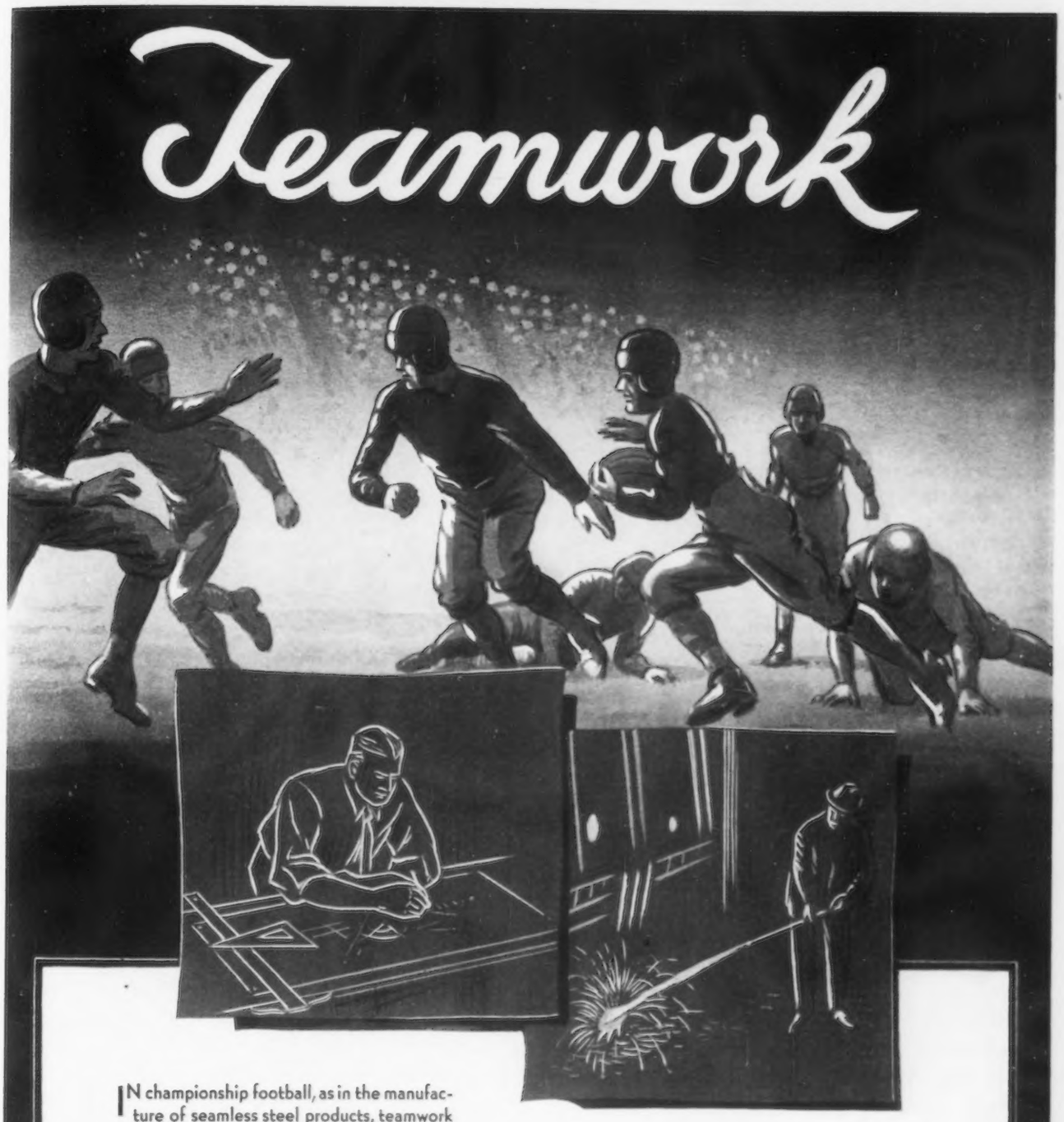
Scully Service

SCULLY STEEL PRODUCTS CO.

CHICAGO NEWARK, N. J. PITTSBURGH CLEVELAND
ST. LOUIS BOSTON ST. PAUL BALTIMORE

UNITED STATES STEEL

Teamwork

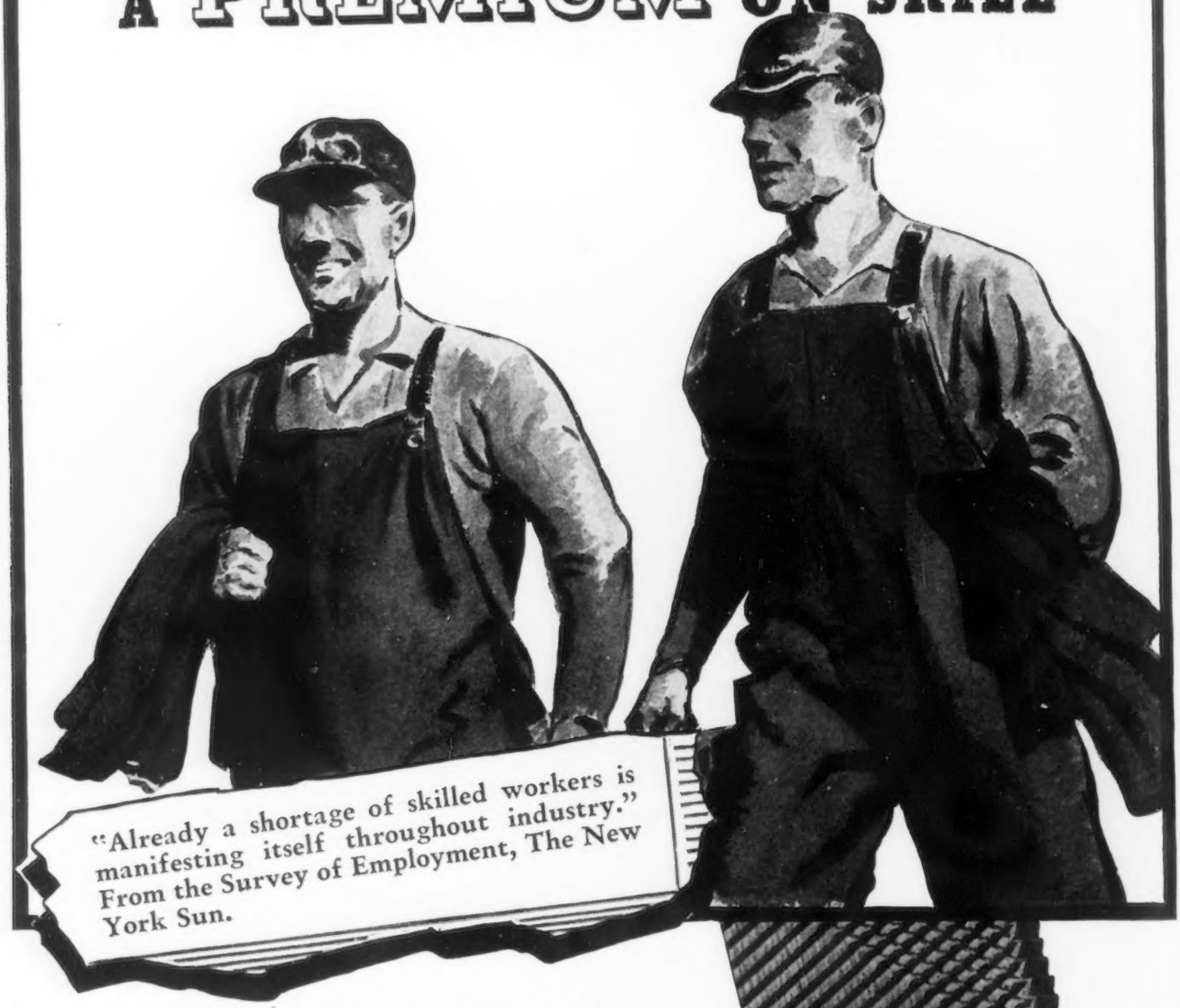


IN championship football, as in the manufacture of seamless steel products, teamwork is of the utmost importance. At Harrisburg, from the manufacture of steel to the completion of the finished product, every employee from executive to laborer collaborates in furnishing, at the least expense, products that meet exacting specifications. Such teamwork as this is typical of Harrisburg's entire manufacturing facilities. Add to these a self-contained plant and an illustrious record of notable contributions to America's seamless and forged steel industry, and it is apparent why "the standard" is so universally attached to these Harrisburg products: pipe flanges, couplings, bull plugs; gas cylinders, pump liners, coils and bends; drop and hollow forgings, carbon and alloy steels ✣ Harrisburg, Pennsylvania.

H

HARRISBURG STEEL CORPORATION

A PREMIUM ON SKILL



"Already a shortage of skilled workers is manifesting itself throughout industry." From the Survey of Employment, The New York Sun.

In your plant, where there will be an increasing premium on skilled workers and every minute of their time, use Nicholson, Black Diamond or McCaffrey Files.

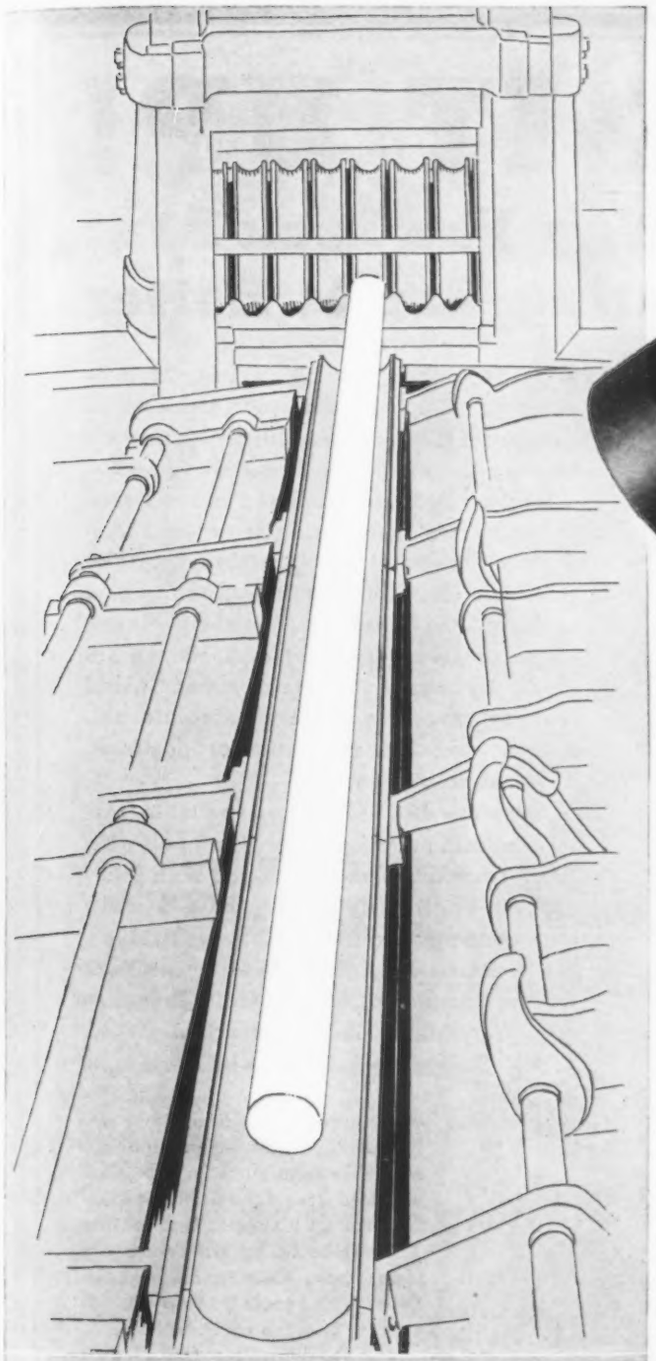
These three brands have a keener bite. The principle of tooth construction—controlled irregularity—makes possible up to three times as many cutting edges per square inch, and keeps the files on the line of work.

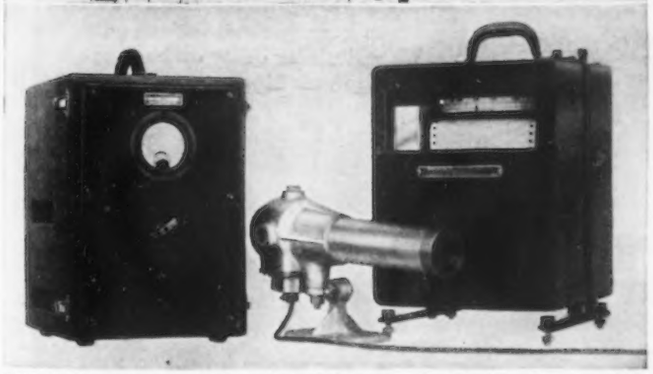
Production executives, who place a premium on quality files for skilled workers, are using Nicholson, Black Diamond and McCaffrey Files.

Try them. Your mill supply dealer can meet your needs. Nicholson File Company, Providence, R. I., U. S. A.

PATENTS PENDING

A FILE FOR EVERY PURPOSE





Bristol's Electronic Instagraph consists of a Potentiometer Amplifier (shown at left), Thermo-Photronic Tube (at center), and Strip Chart Recorder (at right). Range 0 to 2250°F.

GETS BILLETS *on the run!*

"Aim and read". This is all you have to do with Bristol's Electronic Instagraph to measure the temperatures of hot billets. No matter how fast they are speeding through the mill, this new mill pyrometer works still faster,—as fast, in fact, as the speed of light. Response is instantaneous.

The optical unit is compact and sturdy. It has the ruggedness plant operators prefer. To assure close reading, the graduations on the strip chart scale are extra far apart,—as much as 3/16 inch for every 10°F at 2100°F. And ¼ inch for every 10°F at 2250°F. Since calibration is permanent, readings are consistently accurate.

Don't confuse Bristol's Instagraph with optical, radiation or thermocouple pyrometers. It is entirely different—and works on an entirely different principle. Bulletin No. 476-A shows how this is so. On request.

THE BRISTOL COMPANY, WATERBURY, CONN.

Branch Offices: Akron, Birmingham, Boston, Chicago, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Seattle, St. Louis, San Francisco. Canada: The Bristol Company of Canada, Limited, Toronto, Ontario. England: Bristol's Instrument Company, Limited, London, N. W. 10

BRISTOL'S

TRADE MARK REG. U. S. PAT. OFF.

PIONEERS IN PROCESS CONTROL SINCE 1889

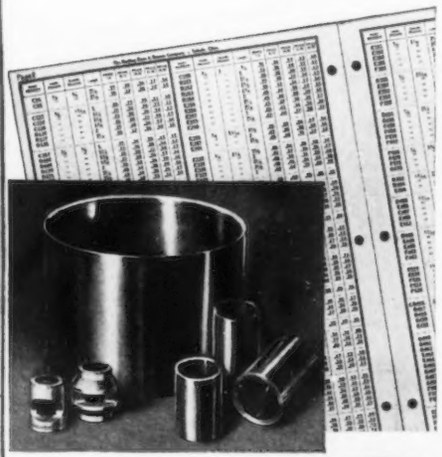
SIZE IT UP!

Any Way You Look At It A Bunting Bar Is Better

● All Bunting Bronze Bars are 13" long instead of 12". This extra inch permits the user to cut the bar into multiples of standard bearing lengths without excessive waste.

Bunting Bars are machined and centered at the factory, eliminating set-up and tooling and the cost of waste metal that must be removed from rough castings. Bunting Bars are produced from the standard alloy in use by most machinery manufacturers and are made by exact, constantly controlled foundry processes, assuring absolute uniformity and the maximum of desirable physical properties

There are 130 stock sizes available from leading mill supply wholesalers in all markets. They can also supply you with Bunting Anti-Friction Metal (Lead Base Babbitt) and Bunting Genuine (Tin Base Babbitt). Write for catalog. The Bunting Brass & Bronze Company ... Toledo, Ohio. Branches and Warehouses in All Principal Cities.



● Completely machined and finished Bunting Bronze Bearings are available from stock in over 600 standard sizes. Electric Motor Bearings for all makes of motors from 1/40 hp to 60 hp are procurable from stock. Catalog on request. Patterns and tools for over 30,000 special designs and sizes. Engineering and metallurgical counsel are at your disposal without cost. We will gladly quote on bearings made to your blue print.

BUNTING Quality

BRONZE BUSHINGS • BEARINGS

MACHINED AND CENTERED BRONZE BARS

ANTI-FRICTION BABBITT

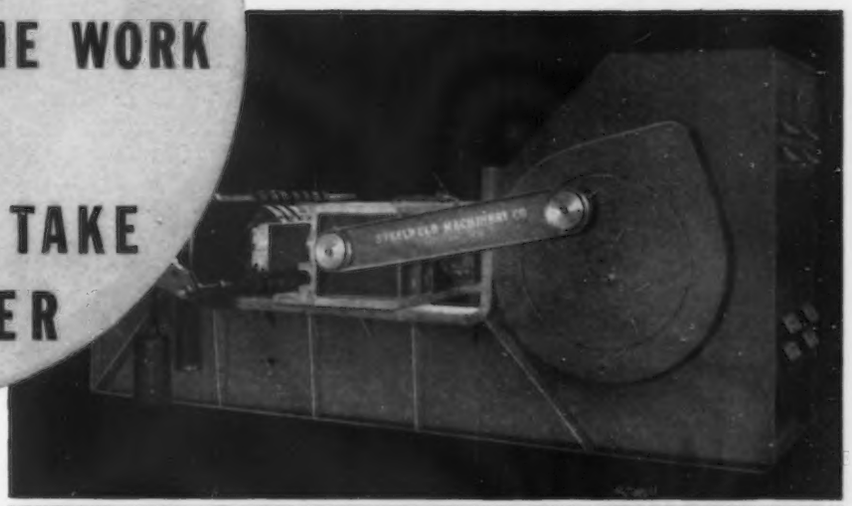
STEELWELD BULLDOZERS

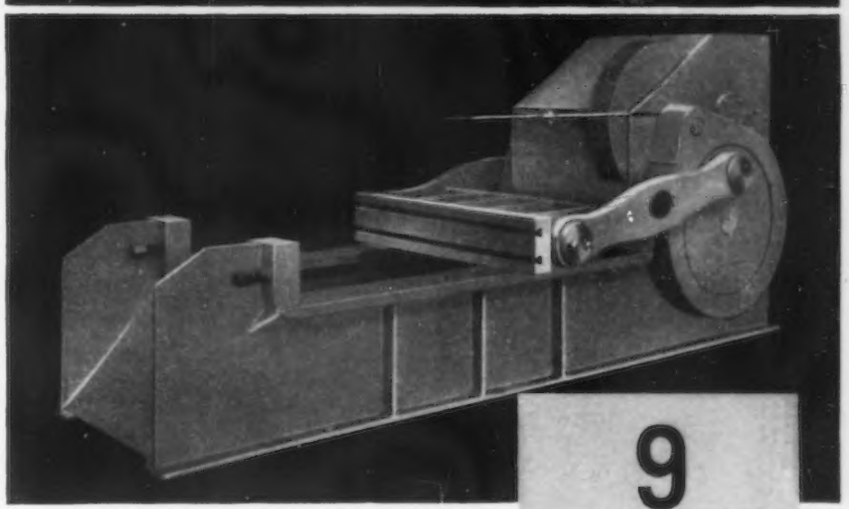
combine

POWER TO DO THE WORK

with

A FRAME TO TAKE THE POWER





• Steelweld Bulldozers with their adjustable die holders, their high alloy crank and ram pins, anti friction bearings, easily adjusted twin disc clutch or direct motor drives, fully enclosed dust tight housings, and with the ram gibbing protected under the hardened and ground ram ways—are fully representative of Steelweld's traditionally high engineering and manufacturing standards.

All steel construction provides at the outset an anvil-like frame rigidity against which the power can be delivered. This construction—a patented feature—available only in Steelweld Press Brakes and Bulldozers, creates a frame so strong that the motor stalls before the ram jams tight. Steelweld Bulldozers *cannot break their frames or tie themselves up.* Service records of five years' operation and full details of the design and construction of these bulldozers that give you today the operating advantages you will insist upon tomorrow, are available on request. Write for descriptive literature.

9

sizes are shop standard . . . What are your requirements?

THE STEELWELD MACHINERY CO., E. 70th St. at Machinery Ave., Cleveland, Ohio

STEELWELD

BULLDOZERS

Thank You

One of our most precious assets is the GOOD WILL of our patrons and friends. Without Good Will, there can be no large degree of satisfaction, or lasting success in business.

YULETIDE brings to us renewed appreciation of Long Standing Associations—and the value of New Friendships . . . for which we are deeply grateful.

Our sincerest wish at this Yuletide Season is for a state of Happiness and an all-inclusive Prosperity — the like of which has never been previously experienced in our great Country.

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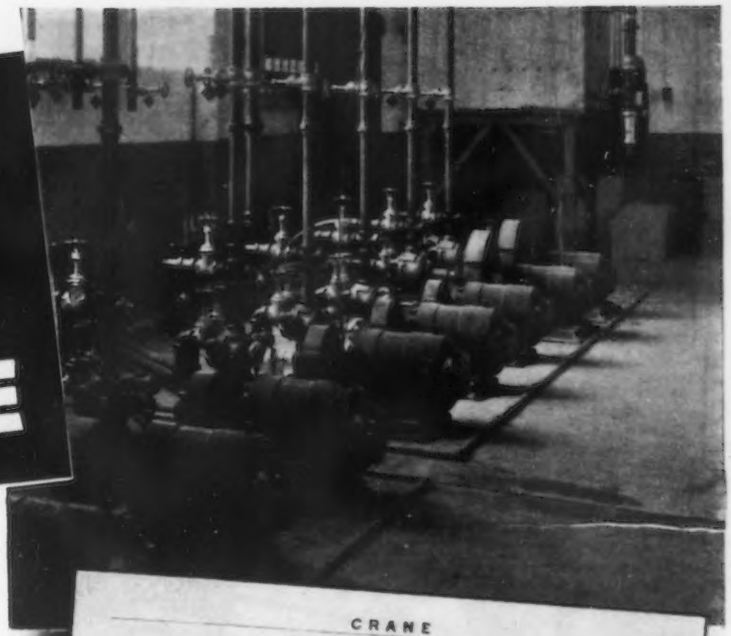
Worth Products include:

Sheared Steel Plates up to 150" wide.
Flanged and Dished Heads in large diameters and heavy gauges, etc.
Blue Annealed Sheets in all gauges down to No. 16 and widths up to 60". Greater widths on application.

WORTH

WORTH STEEL COMPANY · CLAYMONT · DEL.

Brass Valves FOR SEVERE SERVICE



● The Crane No. 431 150-Pound Brass Wedge-Disc Gate Valve is recommended for service on steam, water, oil or gas lines where the service requires a heavier construction than found in "standard" valves.

Staunchly built and well proportioned, it has an ample margin of safety for the more severe services for which it is intended. Liberal length of thread at the bonnet joint, generous stem-thread engagement and deep stuffing box with gland are among the numerous refinements which contribute to the valve's dependability.

Disc and seat are especially machined and ground to provide extra allowances for wear. Precision guides give still further protection against wear by preventing rubbing action between disc and seat during closing and opening.

Scientific selection of materials, correct design, precision workmanship and close metallurgical and manufacturing control, are the factors which make for dependability in Crane valves and fittings. The line is complete. Just telephone your needs to the Crane branch or distributor in your city.

Let Profits Pay for Plant Improvements. Use the Crane Finance Plan.

CRANE

41

150-Pound

Brass Gate Valves

Wedge Disc

WORKING PRESSURES

Screwed valves—150 pounds steam
300 pounds cold water, oil, or gas, non-shock

Flanged valves—150 pounds steam
225 pounds cold water, oil, or gas, non-shock

Cross Section Non-Rising Stem No. 437

Non-Rising Stem No. 437 Screwed

Non-Rising Stem No. 437½ Flanged

Rising Stem No. 431 Screwed

Rising Stem No. 429 Flanged

Cross Section Rising Stem No. 431

List Prices

Size	Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
No. 437, Screwed	Each	1.45	1.45	1.65	2.00	2.80	3.70	5.00	7.30	13.00	19.00
No. 437½, Flanged, F. & D.	Each				2.00	2.80	3.70	5.00	7.30	13.00	19.00
No. 431, Screwed	Each	1.45	1.45	1.65	2.00	2.80	3.70	5.00	7.30	13.00	19.00
No. 429, Flanged, F. & D.	Each				2.00	2.80	3.70	5.00	7.30	13.00	19.00

Service recommendations: These valves are recommended for steam, water, oil, or gas where the service requires a heavier construction than found in Standard valves.

No. 437 and No. 437½ Gate Valves: The No. 437 and No. 437½ are non-rising stem valves. They are more massive and are heavier in construction than the No. 438 Standard Wedge Disc Gate Valves shown on page 38.

They have a gland in the stuffing box, and when wide open can be repacked while under pressure.

No. 431 and No. 429 Gate Valves: The No. 431 and No. 429 are rising stem valves. Their solid wedge disc slips onto the stem, and is accurately guided in the body.

The valves have a gland in the stuffing box, and when wide open can be repacked while under pressure.

Flanged valves: End flanges conform to the MSS 150-Pound SP Bronze Flange Standard (No. SP-58-1936). They are plain faced, with two V-shaped concentric grooves between the port and the bolt holes. Prices include drilling to the MSS. If ordered "faced only" a deduction is made.

Full face gaskets should be used: see page 137

Dimensions, in Inches

Size		¼	⅜	½	¾	1	1¼	1½	2	2½	3
No. 437 and No. 437½	End to end, No. 437	1¾	1¹⁵⁄₁₆	2⅛	2⅜	2¾	3⅛	3½	4	4½	4¹⁵⁄₁₆
	Face to face, No. 437½	1¾	1¹⁵⁄₁₆	2⅛	2⅜	2¾	3⅛	3½	4	4½	4¹⁵⁄₁₆
	Center to top of wheel	3⅛	3⅜	4¼	4⅝	5	5⅜	6	6½	7½	7¾
	Diameter of wheel	3⅛	3⅜	4¼	4⅝	5⅝	6½	7½	8½	10	11½
No. 431 and No. 429	End to end, No. 431	1¾	1¾	2⅛	2⅜	2¾	3⅛	3½	4	4½	4¹⁵⁄₁₆
	Face to face, No. 429	1¾	1¹⁵⁄₁₆	2⅛	2⅜	2¾	3⅛	3½	4	4½	4¹⁵⁄₁₆
	Center to top of wheel, open	3⅛	3⅜	4¼	4⅝	5	5⅜	6	6½	7½	7¾
	Diameter of wheel	3⅛	3⅜	4¼	4⅝	5⅝	6½	7½	8½	10	11½
Flange dimensions	Diameter of flanges	1¾	1¾	3⅛	3⅜	3¾	4⅜	4⅞	6	7	7½
	Thickness of flanges				7/16	7/16	7/16	7/16	7/16	7/16	7/16

Templates for drilling page 369

Crane No. 431 Gate Valves on pump lines. For complete description, service recommendations, prices and dimensions see page 41, new Crane No. 52 Catalog.

CRANE

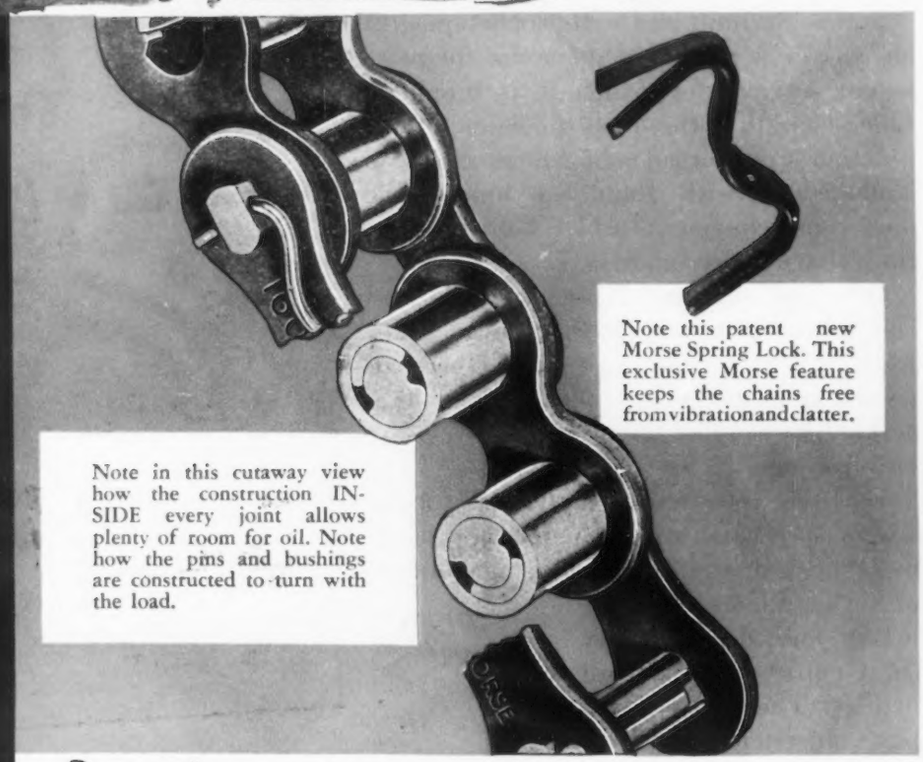
CRANE CO., GENERAL OFFICES: 836 SOUTH MICHIGAN AVE. CHICAGO, ILL. • NEW YORK: 23 W. 44TH STREET

Branches and Sales Offices in One Hundred and Sixty Cities

VALVES, FITTINGS, FABRICATED PIPE, PUMPS, HEATING AND PLUMBING MATERIAL

Just as a Supply of take in

Says the Encyclopaedia: A camel can carry a load 25 miles a day for three days without watering. A horse should be watered twice a day for the same trip.



Note this patent new Morse Spring Lock. This exclusive Morse feature keeps the chains free from vibration and clatter.

Note in this cutaway view how the construction INSIDE every joint allows plenty of room for oil. Note how the pins and bushings are constructed to turn with the load.

STOP N.P.L.

Needless Power Loss

N. P. L. (Needless Power Loss) is a drag on your production schedules and manufacturing profits. Stop N.P.L. Replace old-fashioned, slipping, fraying and grinding transmission drives with Morse Positive, 98.6% efficient Drives and watch your schedules and profits gain new momentum.

Packed **WITH IMPROVEMENTS FROM COTTER PIN TO BUSHING.** Because Morse Roller Chains have an extra space between the segmental bushings and the rollers' cores they can take in and hold 70% more oil. But that is only one of the stand-out features of these brilliant performers. Rollers are precision ground from a newly perfected alloy steel. Pins and bushings are cold-drawn from a carburized, heat-treated, chrome-nickel steel. The new snap-lock cotter pin banishes vibration and speeds up installation.

MORSE

MORSE CHAIN COMPANY

BRANCH OFFICES IN ALL PRINCIPAL CITIES

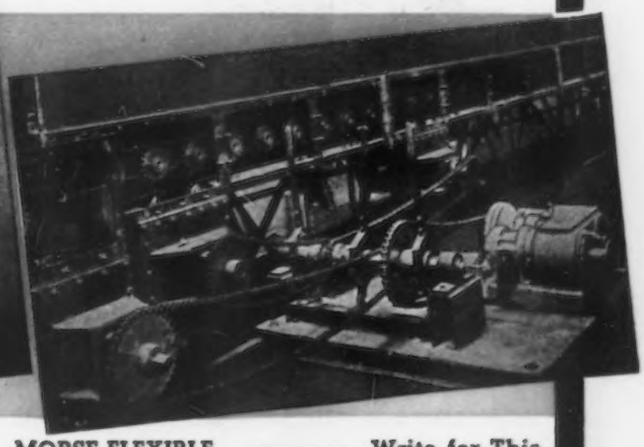
CAMEL takes in an extra water, MORSE ROLLER CHAINS and hold 70% more oil

OIL GETS IN—WEAR STAYS OUT

Because a camel sports a spare storage tank next to his stomach, he can lap up and hold more water than any animal ever taught to carry a pay load. And because MORSE ROLLER CHAINS are engineered with an oil reservoir inside every roller joint, they can take in and hold more oil than any roller chain ever built to transmit a power load.

Morse Roller Chains can't help but last longer. They can't help but run smoother They can't help but turn over stiff loads with ease. The way Morse Roller Chains are built, it's no wonder they spin merrily on—day after day and year after year—without a rattle or a clank or a growl. Metal-dust doesn't bother them. Sudden load-shocks don't loosen them. Hard use can't hurt them. And yet, Morse Improved Roller Chains cost no more than ordinary chains.

Take a tip from Morse Chain users. Use Morse easy-lubricating, 98.6% efficient, long-wearing Roller Chains and watch your power output climb, your maintenance expenses drop and your profits fatten. Phone the Morse man near you or drop a line to our engineers here in Ithaca.



MORSE SILENT CHAINS

You can get Morse Silent Chains up to 50 H.P. in 24 hours or less. You can get them up to 5000 H. P. by special order.

MORSE FLEXIBLE COUPLINGS

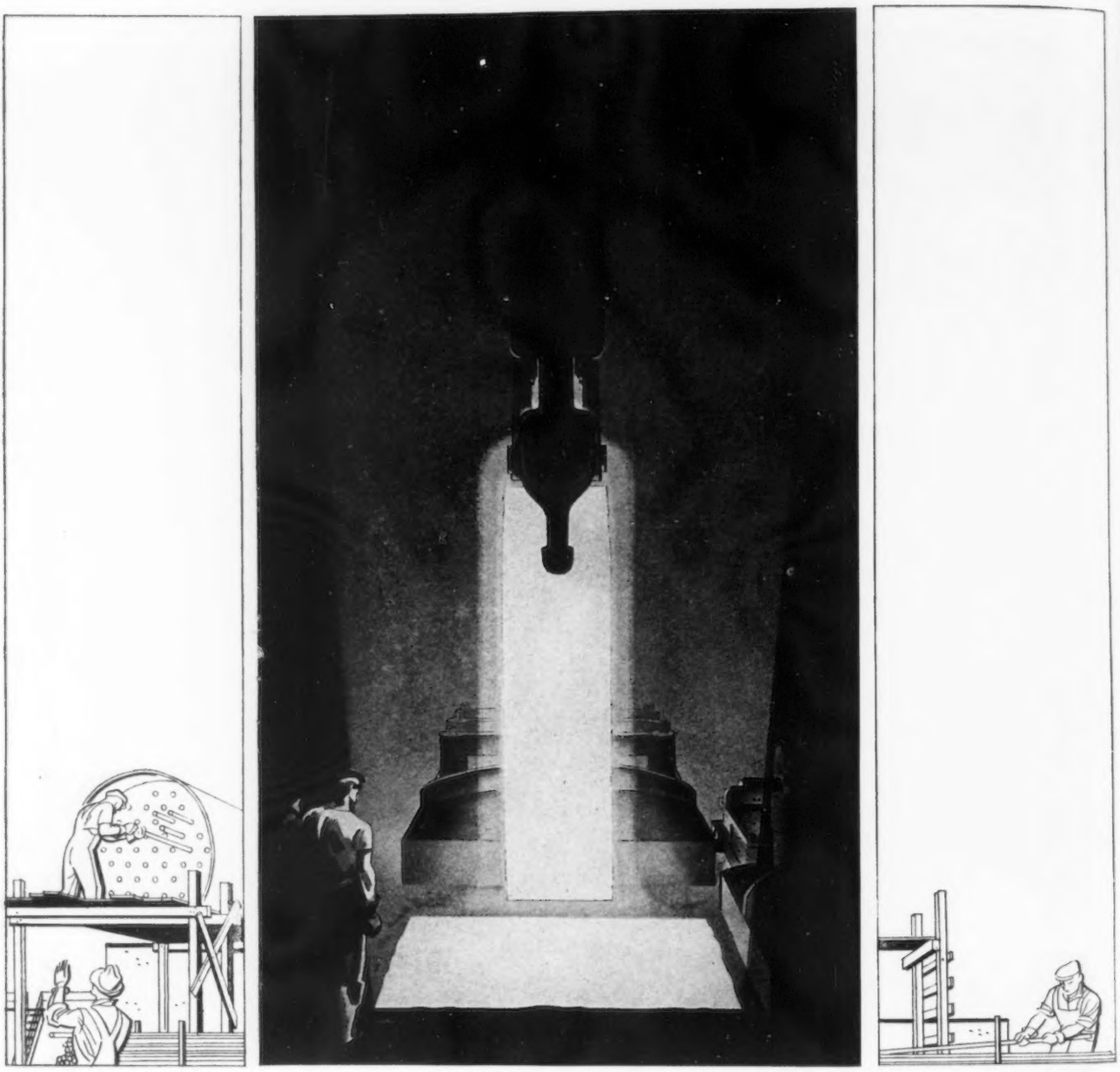
Morflex rubber-bushing-type and Morse Standard sprocket-type couplings are stocked in all standard sizes for immediate delivery.

Write for This HANDY BOOK

This handy new MORSE STOCK BOOK contains a wealth of information about power drives. A copy is yours for the asking.

Roller CHAINS

ITHACA N.Y. DIVISION OF BORG WARNER CORP.



SOAKED TO PERFECTION

Fresh from its mold, and still red hot, the ingot is transferred to the "soaking pit" where it is allowed to "soak" until it is uniformly heated to a temperature of from 2,000 to 2,200 degrees, Fahrenheit, depending on the analysis of steel. Here the steel is skilfully prepared for blooming and billet mill rolling operations. It is but one of a series of manufacturing operations under single company responsibility that insures the well-known dependability of Pittsburgh Seamless steel tubular products for high pressure piping, heat exchanger tubes, boiler tubes and condenser tubes.

PITTSBURGH STEEL COMPANY · PITTSBURGH, PA.

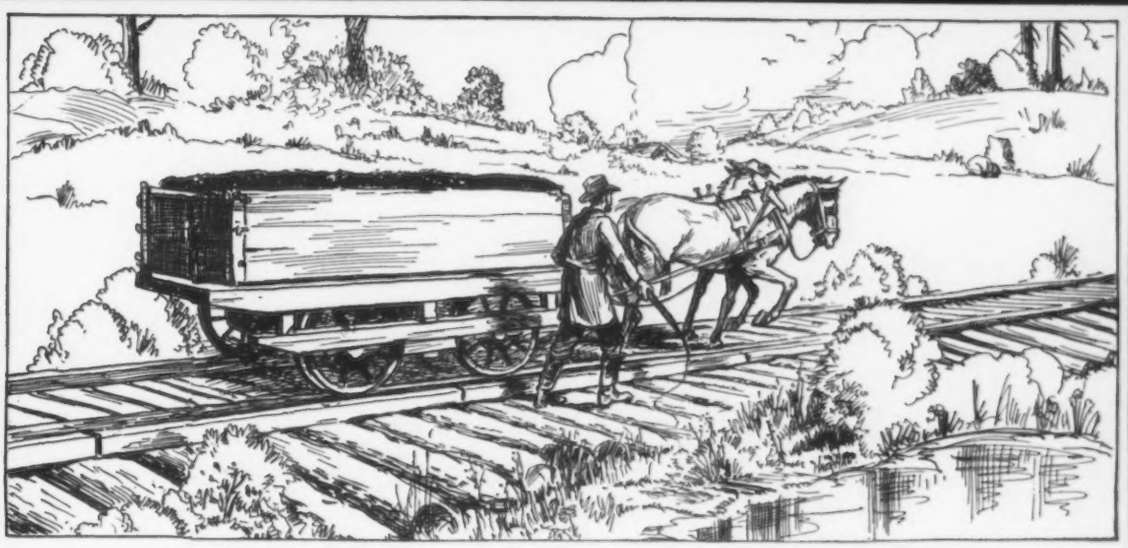
New York Detroit Chicago St. Louis Houston Tulsa Los Angeles San Francisco Charlotte

Pittsburgh Seamless

CONDENSER TUBES · BOILER TUBES · HEAT EXCHANGER TUBES
HIGH PRESSURE PIPING

THERE IS NOTHING SUPERIOR TO SEAMLESS

SINCE 1850



The Old Strap Railroad from Negaunee to Marquette, Mich.
In 1857 mules hauled the product of the early mines of the Jackson Mining Company over a log road on which strap rails were laid.

CLIFFS SHAFT LUMP ORE
FOR OPEN HEARTH FURNACES

•

Lake Superior Iron Ores of All Grades

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COAL—Industrial . . . By Product . . . Domestic

THE CLEVELAND-CLIFFS IRON CO.

UNION TRUST BLDG. CCC CLEVELAND, OHIO

HOT GALVANIZING

IS TO IRON AND STEEL

Both protect the life of the body beneath, but here the simile ceases . . . Risks are a part of stunt flying but they must not enter your rust prevention picture . . . You cannot afford to buy less than genuine, hot dip galvanizing. True, it costs a little more to apply than substitute finishes but it is the least expensive real protection ever invented for iron and steel. Don't take chances, patronize the members of this Association and be assured that the high Association standards for workmanship and thickness of coating will guarantee maximum service per dollar of cost . . . If you have a particular galvanizing problem—consult our research department. They can and will help you . . . American Hot Dip Galvanizers Association, Inc., American Bank Bldg., Pittsburgh, Pa.

IF IT CARRIES THIS SEAL IT'S A JOB WELL DONE

ORIGINAL • INSIGNIA
PROTECTED BY GENUINE HOT-DIP GALVANIZING
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BUY FROM THESE QUALIFIED MEMBERS

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More Production

FROM HIGH SPEED PRESSES *with* GULF QUALITY LUBRICANTS

(Left) This high speed press produces steel stampings, completing several operations at each stroke. Gulf lubricants help keep production at a high rate.

(Below) This press produces a large variety of steel and brass parts with extreme accuracy. Because of the close fitting dies and the long, deep draws, proper lubrication is vital.

Efficient Lubrication saves time-out-of-service for Adjustments and Repairs

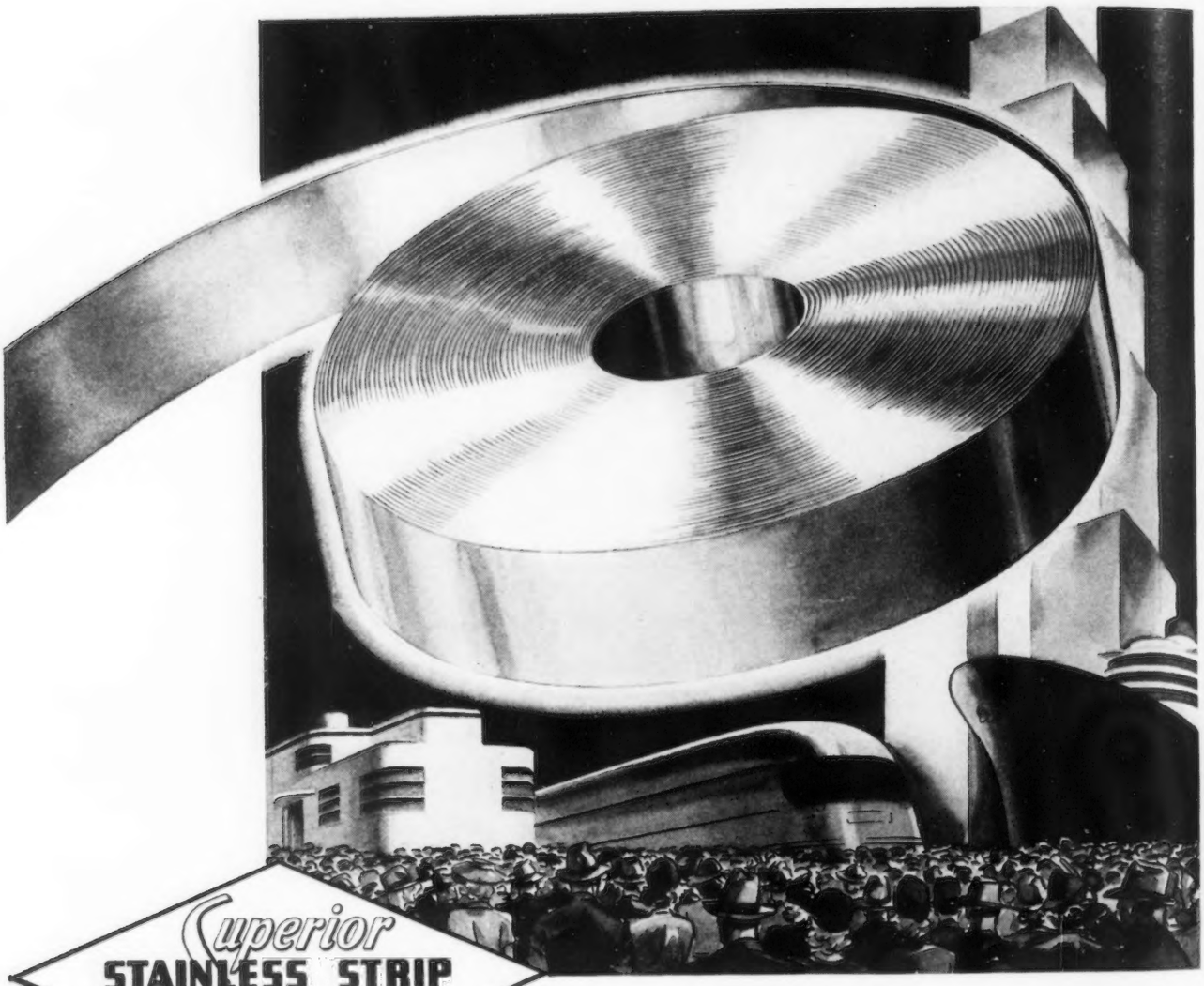
● A high production rate is vital to profitable operation for such machines as are shown above. Time out for adjustments and repairs means lost production, higher operating costs and as a result, lower profits.

Metal working plant operators who are striving for a high rate of production these days are recognizing the need for proper lubrication. They are calling in a Gulf engineer to assist them in placing the lubrication of all their equipment on the most efficient basis possible. This service is extended to all users of Gulf lubricants from Maine to Texas without charge. A Gulf engineer is always at your service.

GULF INDUSTRIAL LUBRICATION

GULF OIL CORPORATION ★ GULF REFINING COMPANY

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.



Superior STAINLESS STRIP Steels

Accepted by Millions!

Private citizens by the million have enthusiastically accepted stainless steel as a mark of quality in the products they purchase.

If you are not using stainless steels as fully as you might in the products you manufacture—whether these products be for the private consumer, or the industrial consumer—try SUPERIOR Stainless Strip Steel.

A half century of experience in producing hot and cold rolled strip steel has given us intimate knowledge of what strip steel users require. SUPERIOR Stainless Strip is but one indication of how we are meeting those needs.

If you have a special problem let our engineers help you.

SUPERIOR STEEL CORPORATION

GENERAL OFFICE: GRANT BLDG., PITTSBURGH, PA. WORKS: CARNEGIE, PA.

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BRACE-MUELLER-HUNTLEY, INC., 130 SOUTH ELMWOOD AVE., BUFFALO, N. Y. 953 LYELL AVE., ROCHESTER, N. Y., HILLS BLDG., SYRACUSE, N. Y.

PRODUCTION CURVES REFLECT IT!

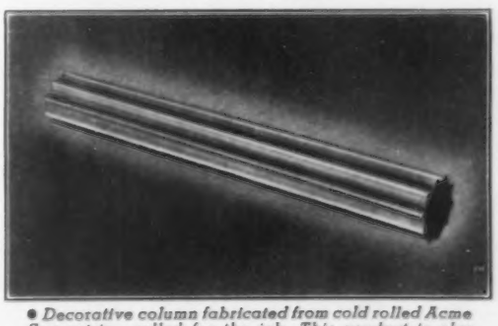
Acme Superstrip Fabricates Easier —Faster—Better

• Rising curves on production charts in hundreds of manufacturing plants reflect the advantages of Acme Superstrip. Made to meet individual drawing, forming or welding requirements. Acme Superstrip effects production economies and increases output.

The fine quality and flawless finish of Acme Superstrip reduce waste and rejections to a minimum. Superstrip is shipped "ready to use." Specially packed to eliminate unnecessary handling and to fit your production methods.

Send for your copy of "Batting 'Em Out," which illustrates and describes many products made better and faster with Acme Superstrip. ACME STEEL COMPANY, General Offices: Chicago. *Branches and Sales Offices in Principal Cities.*

• Brake drum used on well-known automobile. Made from hot rolled Acme Superstrip. This is a typical example of a part requiring close co-operation between customer and mill.



• Decorative column fabricated from cold rolled Acme Superstrip—rolled for the job. This product is also made from Acme stainless Superstrip.

ACME STEEL COMPANY, 2825 Archer Ave., Chicago
Send me a free copy of the booklet, "Batting 'Em Out."

Name_____

Firm_____

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City_____ State_____

Acme Superstrip

HOT ROLLED • COLD ROLLED — The ACME of STRIP STEELS — GALVANIZED • STAINLESS

" AS WATERPROOF

INDUSTRIAL TYCOL OILS-GREASES

TIDE WATER

THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS

The Hindenburg, world's largest and only Diesel powered Zeppelin uses

VEEDOL

A TIDE WATER Product

Soap is a thickening agent which controls the rate of flow of the lubricant to the bearings, just as a sponge controls the water it has absorbed.

Maximum economical lubrication per pound of grease is assured by the use of cylinder oil, making a minimum of soap necessary.

AS A DUCK'S BACK"

"We had an unusually severe water condition at our plant," said one engineer "The lubricant we formerly used sometimes oxidized. Then we switched to Tycol . . . it was as waterproof as a duck's back and our troubles were over. Best of all, our lubricating costs are lower than ever before."

Comparatively few mills have an operating condition exactly like this one, but to all operators the ability of Tycol Green Cast Greases to "stay put" under all conditions is an inherent advantage. The secret is the paraffine base cylinder stock, readily identified by its natural green cast. The use of a maximum amount of lubricating oil per pound of grease means better, more economical lubrication which frequently results in savings that run as high as 30 per cent. Of unusual stability, Tycol Green Cast Grease is compounded in a consistency for every purpose—whether the service be indoor or out.

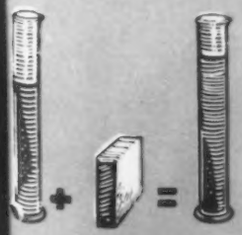
There is a Tycol lubricant that will effect important economies for you. Tide Water engineers will be glad to recommend the consistency best adapted to your needs.

TIDE WATER ASSOCIATED OIL COMPANY

17 Battery Place, New York, N. Y.

GREEN CAST GREASES

SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

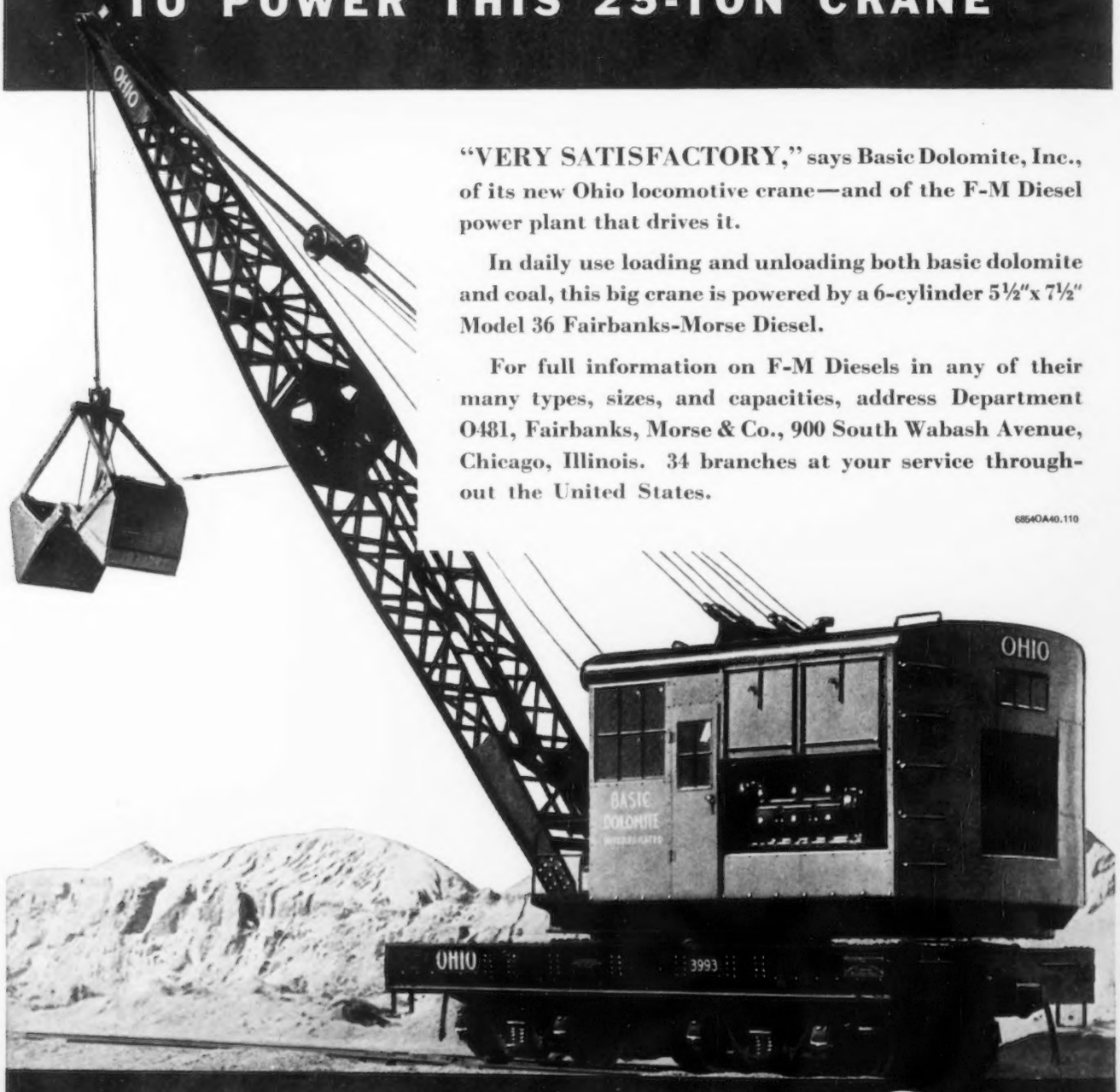


Tycol Green Cast Greases are made of paraffine stock cylinder oil—having high flash and fire points, with maximum film strength.

Tycol Green Cast Greases are compounded to suit every operating condition—for indoor and outdoor service, for anti-friction or plain bearings.

Ohio Locomotive Crane Co. Picks an F-M 36

TO POWER THIS 25-TON CRANE



"VERY SATISFACTORY," says Basic Dolomite, Inc., of its new Ohio locomotive crane—and of the F-M Diesel power plant that drives it.

In daily use loading and unloading both basic dolomite and coal, this big crane is powered by a 6-cylinder 5½"x 7½" Model 36 Fairbanks-Morse Diesel.

For full information on F-M Diesels in any of their many types, sizes, and capacities, address Department O481, Fairbanks, Morse & Co., 900 South Wabash Avenue, Chicago, Illinois. 34 branches at your service throughout the United States.

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Diesel Engines

POWER, PUMPING AND WEIGHING EQUIPMENT

NOW . . . selected areas on a machine part can be heat treated under close temperature control *without heating the entire part*, making the process invaluable because it reduces the handling of large units. Moreover, distortion due to over-all heating of large parts is practically eliminated. The comparatively small investment required for apparatus is a further outstanding advantage. ℂ The Airco-DB torches developed for the flame hardening process combine both the heating and the quenching functions. They are available for a variety of applications. ℂ For full information apply to the AIR REDUCTION office nearest you.

AIR REDUCTION
SALES COMPANY

General Office: 60 EAST 42nd STREET, NEW YORK

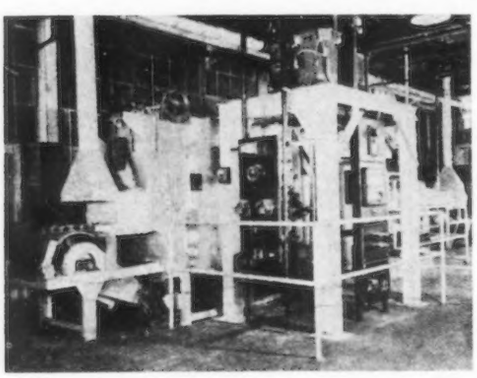
District Offices and Distributing Stations in Principal Cities

Discharge end of a continuous furnace brazing a three piece pulley assembly. This furnace is one of several types built by The Electric Furnace Co., Salem, Ohio. Miscellaneous parts are securely joined in these furnaces and discharged—clean and bright.
Products ranging from small radio tube parts to heavy automotive and refrigerator units are neatly and economically joined in brazing furnaces built by The Electric Furnace Co., Salem, Ohio. It might pay to investigate this process for joining your products.

Join Your Metal Parts - Neater, Cheaper and Stronger

—by the continuous furnace brazing method

Metal parts in various shapes and sizes—ferrous and non-ferrous—are being joined neatly, securely and economically in continuous brazing equipment similar to that shown above and below. . . . The assemblies are loaded on a traveling belt, carried through this equipment in our special, inexpensive atmosphere and discharged, securely joined—clean and bright. . . . Products difficult or expensive to make in one piece can now be made in several pieces and joined—thus not only reducing the cost but actually improving the quality and appearance. . . . Products requiring several stampings joined or requiring screw machine parts, forgings and stampings to complete the unit, can be neatly and economically joined right in your own shop. . . . Any number of joints in the same product or any number of pieces can be joined at one time. The most intricate parts or assemblies are made to actually "grow together," and joints made which are as strong as the original parts. . . . On some parts it is possible to anneal and braze in one operation. . . . We will be glad to give you additional information, put samples of some of your products through this equipment to show you the results you can expect, and give you an estimate on the cost of the equipment to handle your production, together with operating cost, etc. . . . Send for printed matter on our brazing furnaces. Investigate the brazing process for *your* products. You can join metal parts, neater, cheaper and stronger by this method.



Charging end of a continuous brazing furnace showing automatic controls, transformers and generator for producing the inexpensive atmosphere used in this equipment.

Our engineers will also be glad to discuss our new developments in bright annealing or scale-free heat treating equipment, or work with you on any of your other furnace or heat treating problems.

THE ELECTRIC FURNACE CO.

Fuel Fired Furnaces

SALEM, OHIO

Electric Furnaces

An R.T.A.S. *man*

will dig into your corrosion-resistance problem*

"Each application of corrosion-resistant metals presents an individual problem. We can make no blanket recommendation as best for all conditions of service. We can and do maintain a staff of *Technical Advisers*, who are available for consultation. It is the duty of these men to study the problems presented by each individual application and to assist the manufacturer or user to select a particular metal or alloy which should give the best service and maximum economy. This Technical Advisory Service, backed by the facilities of our Research Department, is available to all users of corrosion-resistant metals in any form."

V. A. Wallace

Vice-President in Charge of Research and Development, Revere Copper and Brass Incorporated.

* We have available for distribution to interested manufacturers, metallurgists and production executives a few copies of the paper presented by R. A. Wilkins before the A. S. M. E. for the Symposium on Corrosion-Resistant Metals. If you desire a copy of this paper, write our Executive Offices, 230 Park Avenue, New York.

Revere Copper *and* Brass

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1801

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK CITY · MILLS: BALTIMORE, MD. · TAUNTON, MASS. NEW BEDFORD, MASS. · ROME, N. Y. · DETROIT, MICH. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES

JUST BETWEEN US TWO

Don't Spare the 'Orses

A NEW ORLEANS newspaper just wired us for a copy of the last Annual Number to be sent air mail. The Mailing Department told us the postage on the 4½ lb. package was $4.36. Our Scotch blood curdled.

Foresight Saves a Mite

Now, if that newspaper publisher had been foresighted he could have saved himself some money, for we pay postage when copies are sent by second class mail. The 1937 Annual Number will be out just four weeks from today and if you want any extra copies this is a good time to tell us. The price in this country is $2.

Just What He Wanted

This is the time of the year we always say something about giving your friends in the industry a year's copies of The Iron Age as a Christmas gift. The price is $6 in the U. S. We will throw in at no extra charge an appropriate note that you can give to your friends' wives to place in your friends' socks.

Harassed Editors

THIS is also the time of the year when the editors are nerve-wracked from overwork on the Annual. Some of them are even working Sundays. Only the other day we leaned on several editorial desks and attempted to get off our chest that story about the minister who had the uncontrollable twitch in his right eye, but in each instance were invited to get the hell out of here.

Impatient Pole

THIS constant reference to the Annual Number is getting tiresome, but there is just one more thing. This morning a special delivery postcard came in from Poland asking us to rush a copy of the last Annual. This is the first time we have ever received a special delivery postcard.

It was written in German and ended with the phrase, *"Dringend Eilig! ! !,"* which we thought was something polite like *"Hochachtungsvoll," "Hasta la Vista,"* etc., and were disappointed when Miss Froschhammer told us that all it meant was *"Very urgent."*

Incidentally the card was addressed, *"The Iron Age, The World's Greatest Industrial Paper,"* which shows how you can get a slogan over if you keep hammering away at it.

Bouquet

We feel like tossing an orchid at Frank J. Oliver, our Detroit editor, for his brilliant account of the labor situation in the automotive industry on pages 52-54 of the Nov. 26 issue.

From Then on They Stayed

"SELF-scouring plow," a phrase used in a Lamson & Sessions advertisement puzzled us. So we asked John C. Stephan, the Cleveland industrial advertising agent, who prepared the advertisement, to enlighten us. He did.

It seems that in 1837, eighteen years before John Williams started The Iron Age, John Deere set up a blacksmith shop in Grand Detour, Ill. He found that the settlers there refused to remain settled. They moved on because their iron plows became gummed up in the rich, black, gluey soil.

The only steel available was a piece of broken mill-saw blade made in England. Deere made this into a plow and tried it on the stickiest soil in the section. Instead of gathering gumbo, it turned a clean furrow, and polished itself in the process. You know the rest.

Incidentally, his steel, imported from England, cost him nearly $300 a ton, which shows how much you have to be thankful for.

Stopper

"WANTED: Soft Jobs for Maintenance Men"—Harnischfeger Corp., p. 79, Dec. 3 Iron Age.

Handy Solution

A. *DENISON WILLIAMS tells us that at 12:16-4/11 the hour and minute hands of John Howe Hall's clock will be exactly at right angles. He also says that at intervals of 32-8/11 minutes the hands will be in line or over each other. Try it on your electric clock.*

—A. H. D.

THE UTMOST IN CONVENIENCE FOR BUSY EXECUTIVES

Combine personal comfort with business efficiency by making your headquarters at The Biltmore while in New York. Large, airy rooms, splendid meals, thoughtful service and an address of recognized distinction.

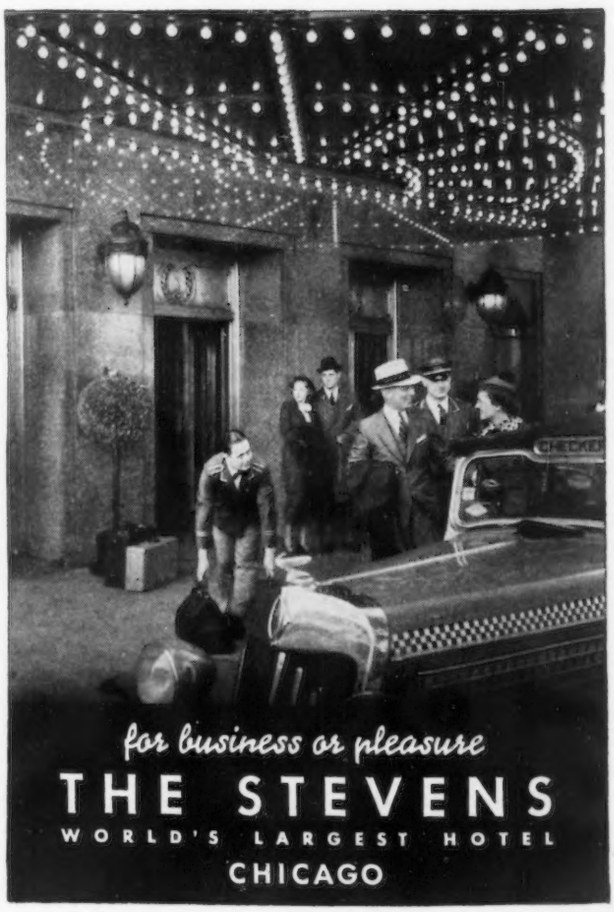
Single rooms from $5. Double rooms from $7
Suites from $12 Monthly rates on application

THE BILTMORE

David B. Mulligan, President

Madison Ave., 43rd to 44th Sts., New York

Adjoining Grand Central



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We are proud of this record.

Send your next Stamping inquiry to us and get acquainted with Crosby Service.

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MACHINE SCREWS — SPECIAL STUDS
MACHINE SCREW NUTS — SPECIAL SCREWS

COMMUNICATE WITH
THE HOUSE OF SERVICE

THE PROGRESSIVE MANUFACTURING CO.
TORRINGTON, CONN.

We please those discriminating manufacturers who not only demand quality but service as well. Business goes where it is invited and remains where it is well treated. The illustration reveals a few only of the possibilities that are developed by the cold heading process.

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CANADA: WALKER METAL PRODUCTS, LTD., WALKERVILLE, ONT.

BUILT BY HOLCROFT & COMPANY DETROIT-MICH.

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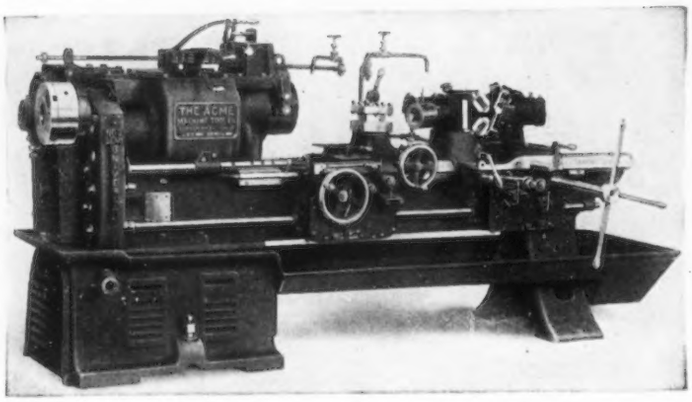
E. F. Krause & Co.—430-440 Commercial St., Los Angeles, Calif.
Hill Chase & Co.—Richmond and Ontario Sts., Philadelphia, Pa.
Wetherell Bros. Co.—251 Albany St., Cambridge, Mass.



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Are Known for Their Dependable Durability

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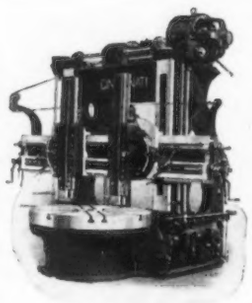

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CRANK PLANERS
PLANER TYPE MILLERS
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CINCINNATI, OHIO

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with THE IRON AGE ANNUAL REVIEW NUMBER!

65,000 key executives in the metal-working industry will start 1937 right by reading The Iron Age's Annual Review Number which will be published January 7.

Manufacturers selling to this industry can start their 1937 promotion plans right by placing a dominant advertisement in that outstanding issue where the 65,000 readers will see it.

Send in your reservation now for space in the Annual Review Number. Closing date is drawing near.

Products Index

ABRASIVE WHEELS — See Grinding Wheels

ABRASIVE CLOTH & PAPER
Norton Co., Worcester, Mass.

ABRASIVES—Steel Shot and Grit
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

ACCUMULATORS—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders & Small Tanks
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

ACID-PROOF CONSTRUCTION
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.

AIR CONDITIONING EQUIPMENT
Clarage Fan Co., Kalamazoo, Mich.

AIR TANKS AND CYLINDERS
Scaife, William B., & Sons Co., Ptgh.

ALLOYS—Calcium
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Copper
American Brass Co., The, Waterbury, Conn.

ALLOYS—Magnesium
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

ALLOYS—Phospher Bronze
Phosphor Bronze Smelting Co., The, Phila.
Riverside (N. J.) Metal Co.

ALLOYS—Titanium
Metal & Thermit Corp., 120 B'way, N. Y. C.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

ALLOYS—Tungsten
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALUMINUM
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

AMMETERS AND VOLTMETERS—Recording
Bristol Co., The, Waterbury, Conn.

AMMONIA RECOVERY PLANTS
Koppers Construction Co., The, Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

ANNEALING—See Heat Treating

ANNEALING BOXES
Lebanon (Pa.) Steel Foundry.
United Engineering & Fdry. Co., Ptgh.

ANNEALING COVERS
Wilson, Lee Engineering Co., The, Cleveland.

ANODES—All Types
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Seymour (Conn.) Mfg. Co.
Udylite Co., The, Detroit.

ANODES—Cadmium
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

ANODES—Zinc
Meaker Co., The, Chicago.

ARBORS
Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY—Cable, Wire, Hose
Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS—Spark
Harrington & King Perforating Co., Chi.

AXLES—Car or Locomotive
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BALANCING EQUIPMENT
Gisholt Machine Co., Madison, Wis.

BALING PRESSES—Scrap—See Presses—Baling

BALLS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn) Steel Ball Co., The.

BALLS—Steel, Brass or Bronze
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Fafnir Bearing Co., New Britain, Conn.
Hartford (Conn) Steel Ball Co., The.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel
Acme Steel Co., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BANDS—Welded
Amer. Welding & Mfg. Co., Warren, O.

BARRELS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

BARRELS—Plating
Crown Rheostat & Supply Co., Chicago, Ill.
Meaker Co., The, Chicago.

BARRELS—Tumbling
Baird Mch. Co., The, Bridgeport, Conn.
Hartford (Conn) Steel Ball Co., The.

BARS—Alloy
Republic Steel Corp., Cleveland, Ohio.

BARS—Brass, Bronze or Copper
Bunting Brass & Bronze Co., Toledo, Ohio.

BARS—Cold Drawn
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Union Drawn Steel Co., Massillon, Ohio.

BARS—Concrete, Reinforcing
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Laclede Steel Co., St. Louis, Mo.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

BARS—Steel
Ames, W., & Co., Jersey City, N. J.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

BATTERIES—Storage
Edison Storage Battery, Div. of Thomas A. Edison, Inc., West Orange, N. J.
Electric Storage Battery Co., The, Phila.

BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Ball
Bantam Ball Bearing Co., The, South Bend, Indiana.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

BEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.
Richardson Co., The, Melrose Park, Ill.

BEARINGS—Quill
Bantam Ball Bearing Co., The, South Bend, Indiana.

BEARINGS—Radial
Bantam Ball Bearing Co., The, South Bend, Indiana.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Roller Bearing Co., Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., Chicago.

BEARINGS—Roll Neck
Bantam Ball Bearing Co., The, South Bend, Indiana.
Morgan Construction Co., Worcester, Mass.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller
Bantam Ball Bearing Co., The, South Bend, Indiana.
Hyatt Roller Bearing Co., Newark, N. J.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Ball Bearing Co., The, South Bend, Indiana.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Ball Bearing Co., The, South Bend, Indiana.
Richardson Co., The, Melrose Park, Ill.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Self-aligning Roller
Shafer Bearing Corp., Chicago.

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- One automatic self-opening die head covers complete capacity range.
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- Chasers are easily and quickly changed. Screw-driver only tool required.
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- Gears are steel-cut, running in oil. Hardened chrome-nickel steel wearing parts.
- TIMKEN ROLLER BEARING equipped.
- Sturdy construction—exceptional reliability.

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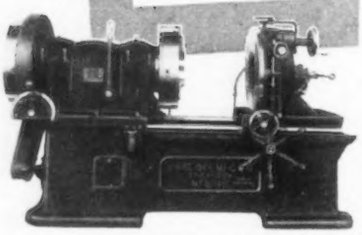

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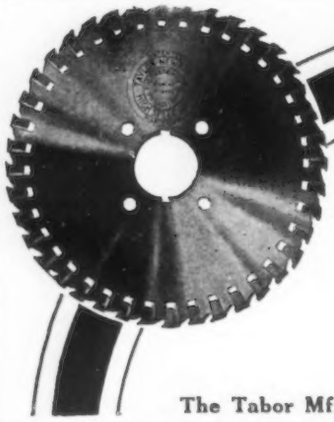

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Die Heads

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Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., Newark, N. J.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., Chicago.

BEARINGS—Thrust
Bantam Ball Bearing Co., The, South Bend, Indiana.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Roller Bearing Co., Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., Chicago.
Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING
Graton & Knight Co., Worcester, Mass.
Rhoads, J. E., & Sons, Philadelphia.

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Bristol Co., The, Waterbury, Conn.
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Bristol Co., The, Waterbury, Conn.

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Graton & Knight Co., Worcester, Mass.
Rhoads, J. E., & Sons, Philadelphia.

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Goodrich, B. F., Co., The, Akron, Ohio.
Graton & Knight Co., Worcester, Mass.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTING CEMENT
Graton & Knight Co., Worcester, Mass.
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Graton & Knight Co., Worcester, Mass.
Houghton, E. F., & Co., Philadelphia.
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Metal, Conveyor, High and Low Temperature
Acme Steel Co., Chicago, Ill.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

BELTING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Graton & Knight Co., Worcester, Mass.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

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Allis-Chalmers Mfg. Co., Milwaukee.
Graton & Knight Co., Worcester, Mass.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Machine & Tool Works, Buffalo, N. Y.

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BILLETS—Alloy Steel
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BILLETS—Carbon Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon Vanadium Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Nickel Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Die Block Steel
Andrews Steel Co., The, Newport, Ky.

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Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Central Iron & Steel Co., Harrisburg, Pa.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Nickel Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

BILLETS—Steel
Bethlehem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Richardson Co., The, Melrose Park, Ill.

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Brassert, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St., N. Y. C.

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Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

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Clarage Fan Co., Kalamazoo, Mich.
Spencer Turbine Co., Hartford, Conn.

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Linde Air Prods. Co., The, 30 E. 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

BLOWPIPES — Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N. J.
Weldit Acetylene Co., Detroit.

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Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

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Erie (Pa.) Bolt & Nut Co.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
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Erie (Pa.) Bolt & Nut Co.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Steve
Blake & Johnson Co., The, Waterville, Ct.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS AND NUTS
Ames, W., & Co., Jersey City, N. J.
Clark Bros. Bolt Co., Millidale, Conn.
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Heiz & Heiz, Inc., 33—34th St., Brooklyn, N. Y.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BORING—Hollow
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

BORING BARS
Bullard Co., The, Bridgeport, Conn.

BORING, DRILLING & MILLING MACHINES—Horizontal
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond, Ind.

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Bullard Co., The, Bridgeport, Conn.

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BORING MACHINES—Diamond & Carbide Tools
Heald Mch. Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

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Cincinnati (Ohio) Planer Co.

BOX STRAPPING
Acme Steel Co., Chicago, Ill.

BOXES—Steel
Berger Mfg. Co., The, Canton, Ohio.

BRAKE LINING AND BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric
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Electric Controller & Mfg. Co., The, Cleveland.

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Stearns Magnetic Mfg. Co., 626 So. 28th St., Milwaukee.

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Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Steelweld Machinery Co., Cleveland.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.

BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BROACHES
Colonial Broach Co., Detroit, Mich.

BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The
Colonial Broach Co., Detroit, Mich.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ampco Metal, Inc., Milwaukee, Wis.

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Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

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Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

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Hayward Co., The, 50 Church St., N. Y. C.
Industrial Brownhoist Corp., Bay City, Mich.

BUCKETS—Electric Motor
Erie (Pa.) Steel Construction Co.
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Erie (Pa.) Steel Construction Co.
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.
Bethlehem (Pa.) Steel Co.

BULLDOZERS
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Steelweld Machinery Co., Cleveland.

BULLDOZERS—Hydraulic
Elmes, Chas. F., Engng. Wks., Chicago.

BURNERS—Oil or Gas
Wilson, Lee Engineering Co., The, Cleveland.

BUSHINGS—Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Phosphor Bronze Smelting Co., The, Phila.
Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.

BY-PRODUCTS COKE AND GAS OVENS
Koppers Construction Co., The, Pittsburgh.

CABLE—Electric
General Electric Co., Schenectady, N. Y.
Simplex Wire & Cable Co., Cambridge A, Boston, Mass.

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CADMIUM
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

CARBIC
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBURIZING—See Heat Treating

CARS—Industrial and Mining
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Bartlett, C. O., & Snow Co., The, Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
American Manganese Steel Co., Chicago Heights, Ill.
Ampco Metal, Inc., Milwaukee, Wis.
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Hoskins Mfg. Co., Detroit, Mich.
Lebanon (Pa.) Steel Foundry.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Alloy Steel
Bissett Steel Co., The, Cleveland.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Brass, Bronze, Copper or Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Phosphor Bronze Smelting Co., The, Phila.
Snyder, W. P., & Co., Pittsburgh.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
American Manganese Steel Co., Chicago Heights, Ill.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Electric Steel
Industrial Steel Casting Co., The, Toledo.
Lebanon (Pa.) Steel Foundry.

CASTINGS—Gray Iron
Cheney, S., & Son, Manlius, N. Y.
Dubois (Pa.) Iron Works.
Midvale Co., The, Nicetown, Phila., Pa.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.)) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.
Malleable Iron Fittings Co., Branford, Ct.
Peoria (Ill.) Malleable Castings Co.

CASTINGS—Manganese Steel
American Manganese Steel Co., Chicago Heights, Ill.

CASTINGS—Monel & Nickel
Superior Bronze Corp., Erie, Pa.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Crucible Steel Castings Co., Lansdowne, Pa.
Industrial Steel Castings Co., The, Toledo.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

CEMENT—Acid Proof
Atlas Mineral Products Co. of Pa., The, Mertztown, Pa.

CEMENT—Quick Setting, Acid Proof & Insulator
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O., & Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O., & Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Silent
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
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CHEMICALS—Industrial
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.

CHEMICALS—Rust Proofing
Alrose Chemical Co., Providence, R. I.
Bonding Process Corp., 10401 Northlawn Ave., Detroit.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

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CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., The, New Britain, Conn.
National Acme Co., The, Cleveland.

CHUCKS—Air Operated
Hannifin Mfg. Co., Chicago.

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Cleveland (Ohio) Twist Drill Co., The.
Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.

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Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

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Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Co., The, Wyandotte, Mich.
Meaker Co., The, Chicago.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.

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Detroit Rex Products Co., Detroit, Mich.
Meaker Co., The, Chicago.

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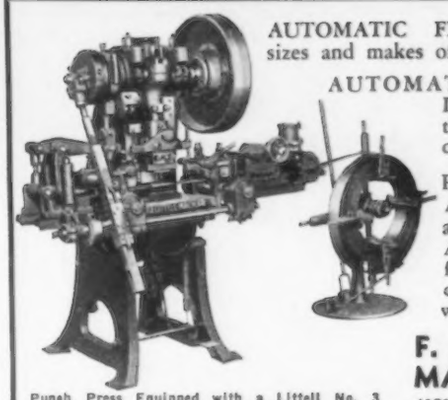
Bullard Co., The, Bridgeport, Conn.
Meaker Co., The, Chicago.

CLEANING MATERIALS—Glass
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., The, Cleve.

CLUTCH-BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 626 So. 28th St., Milwaukee.

CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Hilliard Corp., The, Railroad Ave., Elmira, N. Y.
Medart Co., The, St. Louis, Mo.
Morse Chain Co., Detroit, Mich.
Morse Chain Co., Ithaca, New York.



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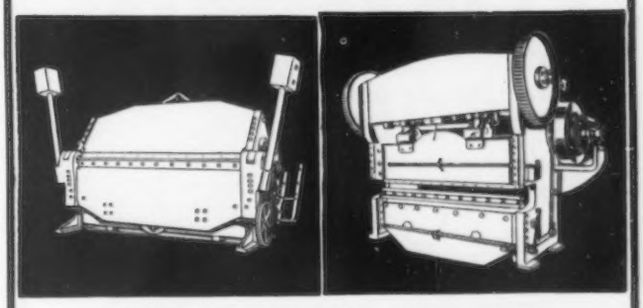

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Dings Magnetic Separator Co., Milwaukee.
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Pickands Mather & Co., Cleveland.

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Robins Conveying Belt Co., 15 Park Row, N. Y. C.

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Pittsburgh (Pa.) Piping & Equip. Co.

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Koppers Construction Co., The, Pittsburgh.

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Koppers Construction Co., The, Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Construction Co., The, Pittsburgh.

COKE OVENS—With Recovery of By-Products
Koppers Construction Co., The, Pittsburgh.

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Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

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Standard Oil Co. (Indiana), Chicago.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

COMPRESSED AIR DRYERS
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee, Wis.

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Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
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Sullivan Machinery Co., Michigan City, Ind.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

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Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Sullivan Machinery Co., Michigan City, Ind.

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CONDENSERS—Surface & Jet
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated
Cutler-Hammer, Inc., Milwaukee.
Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.

CONVEYING AND ELEVATING MACHINERY
Bartlett, C. O., & Snow Co., The, Cleveland.
Link-Belt Co., Chicago.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Gravity
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS—Monorail
American Monorail Co., Cleveland.

CONVEYORS—Portable
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Western Wire Prods. Co., St. Louis, Mo.

COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Durant Mfg. Co., Milwaukee, Wis.
Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording
Bristol Co., The, Waterbury, Conn.
Durant Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Cut-Off Friction
Hilliard Corp., The, Railroad Ave., Elmira, N. Y.

COUPLINGS—Flexible
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Lovejoy Tool Works, Chicago.
Morse Chain Co., Detroit, Mich.
Morse Chain Co., Ithaca, New York.

COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES — Electric, Industrial, Truck Mounted
Baker-Raulang Co., 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling
Armel, James P., Pgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Erie (Pa.) Steel Construction Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Gantry
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power
Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

CRANES—Jib
Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

CRANES—Locomotive
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail
American Monorail Co., Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable
Canton Fdry. & Mch. Co., Cleveland.

CRANES—Portable Electric
Baker-Raulang Co., 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANK SHAFTS
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Union Drawn Steel Co., Massillon, Ohio.

CUTTERS—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Tomkins-Johnson Co., The, Jackson, Mich.

CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

CUTTERS—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland (Ohio) Twist Drill Co., The.
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Cold Saw
Espen-Lucas Mch. Wks., Philadelphia.

CUTTING-OFF MACHINES — Pipe or Tubing
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardons & Oliver, Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS —Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS — Compressed Air & Hydraulic
Tomkins-Johnson Co., The, Jackson, Mich.

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CYLINDERS—Seamless
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEOXIDIZERS
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DIAMOND TOOLS
Bausch & Lomb Optical Co., Rochester, New York.

DIE BLOCKS—Drop Hammer
Finkl, A., & Sons Co., Chicago.
Heppenstall Co., Pittsburgh.

DIE CUSHIONS—Hydro-Pneumatic
Marquette Tool & Mfg. Co., Toledo, Ohio.

DIE CUSHIONS—Pneumatic
Marquette Tool & Mfg. Co., Toledo, Ohio.

DIE SINKING MACHINES—Automatic
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES, JIGS, FIXTURES, etc.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

DIES—Drawing
Vanadium-Alloys Steel Co., Vascoloy-Ramet Div., North Chicago, Ill.

DIES—Pipe Threading
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Screw and Thread Cutting
Eastern Mach. Screw Corp., New Haven, Ct.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Self-Opening Adjustable
Eastern Mach. Screw Corp., New Haven, Ct.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

DIES—Sheet Metal Working
Bliss, E. W., Co., Toledo, Ohio.
Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRILL HEADS—Hydraulic
National Automatic Tool Co., Richmond, Ind.

DRILL HEADS—Multiple
Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

DRILLING MACHINES—Bench
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty
Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Multiple Spindle
Baker Bros., Inc., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford, Conn.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple, Spindle Adjustable
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Horizontal
Baker Bros., Inc., Toledo, Ohio.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable Electric
Buckeye Portable Tool Co., The, Dayton, O.
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

DRILLING MACHINES—Portable Pneumatic
Buckeye Portable Tool Co., The, Dayton, O.
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

DRILLING MACHINES—Rock
Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLING MACHINES—Sensitive
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Upright
Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.

DRIVES—Gear
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts
Allis-Chalmers Mfg. Co., Milwaukee.

DROP FORGINGS—See Forgings—Drop, Iron or Steel

DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS
Abrasive Machine Tool Co., East Providence, R. I.
American Foundry Equipment Co., The, 401 Bykrit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee, Wis.

ECONOMIZERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING
General Electric Co., Cleveland.
General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING — See Welding—Electric

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY — Second Hand. (See Clearing House Section)

ELECTRICAL WIRES
Roebling's, John A., Sons Co., Trenton, N. J.

ELECTRODES—Welding, Coated
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Metal & Thermit Corp., 120 B'way, N. Y. C.
Una Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT & SUPPLIES
Baker Co., The, Chicago.
Crown Rheostat & Supply Co., Chicago, Ill.
Udylite Co., The, Detroit.
United Chromium, Incorporated, 51 E. 42nd St., New York City.

ELEVATORS—Steam Hydraulic
Ridgway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENAMEL
Larkin Co., Inc., Buffalo, N. Y.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, New Jersey.
Sherwin-Williams Co., Cleveland.

ENGINEERS—Consulting and Industrial
Koppers Construction Co., The, Pittsburgh.

ENGINES—Gas
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Fairbanks, Morse & Co., Chicago.

ENGINES—Oil
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Ingersoll-Rand Co., 11 Broadway, New York City.

EYELET MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.

FACING CLAY
Carborundum Co., The, Perth Amboy, N. J.

FACTORY & PLANT SITES
Zoll, Edward H., 196 Market St., Newark, N. J.

FANS—Cooling
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS—Ventilating
Clarage Fan Co., Kalamazoo, Mich.

FEED WATER HEATERS AND PURIFIERS
Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

FELT—Wool Mechanical
American Felt Co., 315 Fourth Ave., N.Y.C.
Felters Co., Inc., The, Boston, Mass.

FENCING—Wire
Continental Steel Corp., Kokomo, Ind.
Pittsburgh (Pa.) Steel Co.

FERROALLOY BRIQUETS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

FERROALLOYS
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Metal & Thermit Corp., 120 B'way, N.Y.C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

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Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

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Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

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Products Index

FILES & RASPS
Disston, Henry, & Sons, Inc., Philadelphia.
Nicholson File Co., Providence, R. I.

FILTERS—Oil
National Acme Co., The, Cleveland.

FILTERS—Pressure or Gravity
Scaife, Wm. B., & Sons Co., Pittsburgh.

FIRE BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

FIRE CLAY
Carborundum Co., The, Perth Amboy, N. J.
Illinois Clay Products Co., Joliet, Ill.

FITTINGS—Brass, Pipe and Tube
Commonwealth Brass Corp., Detroit.

FITTINGS, Cast Iron—Rubber Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.

FLANGES—Forged Steel
Harrisburg (Pa.) Steel Corp.

FLANGING WORK—Carbon and Alloy
Worth Steel Co., Claymont, Del.

FLEXIBLE SHAFT EQUIPMENT
Strand, N. A., & Co., Chicago.

FLOODLIGHTS—Acetylene
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

FLOOR ARMORING
Acme Steel Co., Chicago, Ill.

FLOOR PLATES—See Plates—Floor or Cellar Door

FLOORING—Acid Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

FLOORING—Cast Iron, Unit
Interlake Iron Corp., Chicago.

FLOORING—Open Steel
Hendrick Mfg. Co., Carbondale, Pa.

FLUX—Welding
Linde Air Prods. Co., The, 30 E. 42nd St., N. Y. C.

FORGINGS—Alloy Steel
Heppenstall Co., Pittsburgh.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Brass, Bronze or Copper
American Brass Co., The, Waterbury, Conn.
Commonwealth Brass Corp., Detroit.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

FORGINGS—Coin Pressed
Rockford (Ill.) Drop Forge Co.

FORGINGS—Drop, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Canton (Ohio) Drop Forging & Mfg. Co.
Canton (Ohio) Forge & Axle Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Oliver Iron & Steel Corp., Pittsburgh.
Rockford (Ill.) Drop Forge Co.
Storms Drop Forging Co., Springfield, Mass.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Williams, J. H., & Co., Buffalo, N. Y.

FORGINGS—Hollow
Finkl, A., & Sons Co., Chicago.
Harrisburg (Pa.) Steel Corp.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Finkl, A., & Sons Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Rockford (Ill.) Drop Forge Co.

FUME DUCTS—Rubber Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.

FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flinn & Dreffein Co., Chicago.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Annealing & Case Hardening
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Billet or Ingot Heating
Flinn & Dreffein Co., Chicago.

FURNACES—Electric, Steel Melting
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp

FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C.

FURNACES—Heat Treating, Cyanide or Lead
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.

FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.
Hoskins Mfg. Co., Detroit, Mich.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Pack Heating Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.

GAGE BLOCKS
Ford Motor Co. (Johansson Division), Dearborn, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GAGES—Dial
Federal Products Corp., Providence, R. I.
Starrett, L. S., Co., Athol, Mass.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure and Vacuum, Recording
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Philadelphia.

GAGES—Thickness, for Rolling Mills
Federal Products Corp., Providence, R. I.
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Bausch & Lomb Optical Co., Rochester, New York.
Jones & Lamson Mch. Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GALVANIZING
American Hot Dip Galvanizers Assn., Inc., Pittsburgh.
Cattie, Joseph P., & Bros., Phila.

GALVANIZING—Electro
Meaker Co., The, Chicago.

GALVANIZING EQUIPMENT—Electro
Meaker Co., The, Chicago.

GALVANIZING EQUIPMENT—Electro—For Strip
Meaker Co., The, Chicago.

GALVANIZING EQUIPMENT—Electro—For Wire
Meaker Co., The, Chicago.

GALVANIZING PLANTS—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie (Pa.) Foundry Co.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffein Co., Chicago.
Koppers Construction Co., The, Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Construction Co., The, Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.

GASKETS—Felt
Felters Co., Inc., The, Boston, Mass.

GASKETS—Leather
Graton & Knight Co., Worcester, Mass.

GASKETS—Rubber
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., The, Akron, Ohio.

GEAR CHECKING EQUIPMENT
Michigan Tool Co., Detroit, Mich.

GEAR CUTTING
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Philadelphia (Pa.) Gear Works.
Taylor-Wilson Mfg Co., McKees Rocks, Pa.

GEAR CUTTING MACHINES
Brown & Sharpe Mfg. Co., Prov., R. I.
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Gleason Works, Rochester, N. Y.

GEAR DRIVES—Herringbone
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pttgh.

GEAR LAPPING MACHINES
Michigan Tool Co., Detroit, Mich.

GEARMOTORS
Allis-Chalmers Mfg. Co., Milwaukee.
James, D. O., Mfg. Co., Chicago.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pttgh.

GEAR PLANING MACHINES
Gleason Works, Rochester, N. Y.

GEAR SHAVING MACHINES
Michigan Tool Co., Detroit, Mich.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Richardson Co., The, Melrose Park, Ill.

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GEARS—Heat Treated
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
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Cleveland (Ohio) Worm & Gear Co.
Foote Gear Wks., Inc., 1315 S. Cicero Ave., Cicero, Ill.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Non-Metallic
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Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
General Electric Co., Schenectady, N. Y.
James, D. O., Mfg. Co., Chicago.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.
James, D. O., Mfg. Co., Chicago.
Philadelphia (Pa.) Gear Works.
Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
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Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Ptgh.

GENERATORS — Electric, Second Hand. (See Clearing House Section)

GENERATORS—Electroplating
Meaker Co., The, Chicago.

GLOVES—Asbestos & Fireproof
Safety Equipment Service, Co., The, Cleve.

GOGGLES—Safety
American Optical Co., Southbridge, Mass.
Safety Equipment Service, Co., The, Cleve.

GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

GREASE—Lubricating
Gulf Oil Corp. of Pa., Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

GRILLES—Metal Cane
Diamond Mfg. Co., Wyoming, Pa.

GRILLES—Perforated Metal
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Harrington & King Perforated Co., Chicago.

GRINDING AND POLISHING MACHINES
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Crown Rheostat & Supply Co., Chicago, Ill.
Excelsior Tool & Mch. Co., E.St.Louis, Ill.
Norton Co., Worcester, Mass.
Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

GRINDING MACHINES—Centerless
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GRINDING MACHINES — Cutter & Reamer
Cincinnati (Ohio) Grinders, Incorporated.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cylinder
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GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders, Incorporated
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Norton Co., Worcester, Mass.

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Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Drill
Gallmeyer & Livingston Co., Grand Rapids, Mich.

GRINDING MACHINES—Gear & Worm
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

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Greenfield (Mass.) Tap & Die Corp.
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Centerless
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.

GRINDING MACHINES—Portable Electric
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GRINDING MACHINES—Portable Flexible Shaft
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Strand, N. A., & Co., Chicago.

GRINDING MACHINES—Portable Pneumatic
Buckeye Portable Tool Co., The, Dayton, O.
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

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Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.

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Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Surface
Abrasive Machine Tool Co., E. Prov., R. I.
Blanchard Machine Co., The, Cambridge, Mass.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Heald Mch. Co., Worcester, Mass.
Norton Co., Worcester, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

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Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Norton Co., Worcester, Mass.

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Cincinnati (Ohio) Grinders, Incorporated.
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Norton Co., Worcester, Mass.

GRINDING MACHINES—Valve
Landis Tool Co., Waynesboro, Pa.

GRINDING WHEELS
Bakelite Corp., 247 Park Ave., N. Y. C.
Blanchard Machine Co., The, Cambridge, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Macklin Co., Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Norton Co., Worcester, Mass.

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GRIT—Steel
Pittsburgh (Pa.) Crushed Steel Co.

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HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.
Gallmeyer & Livingston Co., Grand Rapids, Mich.

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Bliss, E. W., Co., Toledo, Ohio
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

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Bradley, C. C., & Son., Inc., Syracuse, N. Y.

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Ingersoll-Rand Co., 11 Broadway, New York City.

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Chambersburg (Pa.) Engineering Co.

HAMMERS—Rawhide
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Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

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S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

HANGERS—Roller Bearing
Hyatt Roller Bearing Co., Newark, N. J.

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Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

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Central Iron & Steel Co., Harrisburg, Pa.
Worth Steel Co., Claymont, Del.

HEADS, Steel—Flanged and Dished
Central Iron & Steel Co., Harrisburg, Pa.

HEAT RESISTING PRODUCTS—Electric
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

HEAT TREATING
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Barnes, Wallace Co., The, Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D., Co., Chicago.
Parish Pressed Steel Co., Reading, Pa.

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Houghton, E. F., & Co., Philadelphia.

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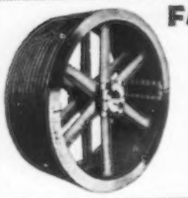

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Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Detroit (Mich.) Hoist & Mach. Co.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Ridgway, Craig & Son Co., Coatesville, Pa.
HOISTS—Chain
Wright Mfg. Co., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.
HOISTS—Electric
Detroit (Mich.) Hoist & Mach. Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Philadelphia (Pa.) Gear Works.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
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Goodyear Tire & Rubber Co., Akron, Ohio.
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HYDRANTS—Fire
Wood, R. D., & Co., Philadelphia.
HYDRAULIC FEEDS
Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.
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Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
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Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
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Brown Instrument Co., Philadelphia.
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KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.
KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.
LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
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Penola, Inc., Pittsburgh.
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Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Oil Co., 17 Battery Pl., N.Y.C.
LUBRICANTS—Mining Machines
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Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Oil Co., 17 Battery Pl., N.Y.C.
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Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
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Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Oil Co., 17 Battery Place N. Y. C.

LUBRICANTS—Tipple & Cleaning
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Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

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Dubois (Pa.) Iron Works.
General Machine Works, York, Pa.
Houde Engineering Corp., Buffalo, N. Y.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS — Second-Hand. (See Clearing House Section)

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Starrett, L. S., Co., Athol, Mass.

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Carborundum Co., The, Perth Amboy, N. J.

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Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleve.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

MALLETS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

MANGANESE METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.
Metal & Thermit Corp., 120 B'way, N. Y. C.

MANHOLE FITTINGS AND SADDLES
Worth Steel Co., Claymont, Del.

MANIFOLDS—Oxygen & Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

MARKING MACHINES
Noble & Westbrook Mfg. Co., The, East Hartford, Conn.

METAL PARTS—Rubber Covered
American Hard Rubber Co., 11 Mercer St., N. Y. C.

METAL SPECIALTIES
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Crosby Co., The, Buffalo, N. Y.
Cuyahoga Spring Co., The, Cleveland.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Ct.) Co.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

METALLOGRAPHIC EQUIPMENT
Bausch & Lomb Optical Co., Rochester, New York.

METALS COATING
Metals Coating Co. of America, Philadelphia, Pa.

METERS—Flow
Brown Instrument Co., Philadelphia.

MICROMETERS
Starrett, L. S., Co., Athol, Mass.

MICROMETERS—Automatic, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

MICRO-PHOTOGRAPHIC EQUIPMENT
Bausch & Lomb Optical Co., Rochester, New York.

MICROSCOPES—Toolmakers
Bausch & Lomb Optical Co., Rochester, New York.

MILLING MACHINES—Automatic
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Bench
Hardinge Bros., Inc., Elmira, N. Y.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Planer Type
Cincinnati (Ohio) Planer Co.

MILLING MACHINES — Second-Hand. (See Clearing House Section)

MILLING MACHINES—Vertical
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

MONEL METAL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

MONORAIL SYSTEMS—Hand & Electric
American Monorail Co., Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

MOTORS—Electric
Allis-Chalmers Mfg. Co., Milwaukee.
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., E. Pgh.

MOTORS—Electric, Second-Hand. (See Clearing House Section)

NAILS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Youngstown (Ohio) Sheet & Tube Co., The.

NICKEL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL ANODES—Rolled or Cast
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NICKEL SILVER
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NITROGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

NOZZLES—Sand Blasting
Norton Co., Worcester, Mass.

NUMBERING MACHINES—For Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

NUTS—Acorn
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Castellated
National Acme Co., The, Cleveland.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Cold Punched
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hot Pressed
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Machine Screw
Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Thumb Malleable
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Wing
Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL—Fuel, Low Sulphur
Bennett Oil Co., Inc., 366 Madison Ave., New York City

OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

OILS—Soluble—See Oils—Cutting

OILS—Cutting
Houghton, E. F., & Co., Philadelphia.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Oil Corp. of Pa., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
Gulf Oil Corp. of Pa., Gulf Refining Co., Pittsburgh.
Houghton, E. F., & Co., Philadelphia
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

ORES—Iron
Cleveland-Cliffs Iron Co., Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

OVENS—Coke and By-Product Recovery
Koppers Construction Co., The, Pittsburgh.

OVENS—Core and Mold
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.

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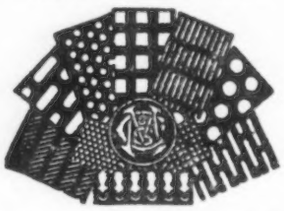

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OXYGEN
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PACKING—Hydraulic
Rhoads, J. E., & Sons, Philadelphia.

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Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
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Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.

PAINT
Larkin Co., Inc., Buffalo, N. Y.
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PERFORATED METAL
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.
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Harrington & King Perforating Co., Chi.
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Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

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Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
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National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

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Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
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Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.
Fisher Bros. Steel Corp., Morris Ave. & 139th St., Bronx.
Greenpoint Iron & Pipe Co., Inc., 187-197 Maspeth Ave., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
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American Hard Rubber Co., 11 Mercer St., N. Y. C.

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Jarecki Mfg. Co., Erie, Pa.
Landis, Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo.
Murchey Murchey Machine & Tool Co., Detroit.
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PLANERS
Cincinnati (Ohio) Planer Co.

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Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.

PLASTICS — Laminated or Molded Phenolic
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATING—Chromium
United Chromium, Incorporated, 51 E. 42nd St., New York City.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.
New Departure Mfg. Co., Bristol, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRESS BEDS—Pneumatic
Marquette Tool & Mfg. Co., Toledo, Ohio.

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Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Transue & William Steel Forging Corp., Alliance, Ohio.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Berger Mfg. Co., The, Canton, Ohio.
Crosby Co., The, Buffalo, N. Y.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Transue & William Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Bliss, E. W., Co., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford, Conn.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Galland-Henning Mfg. Co., Milwaukee.

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Zeh & Hahnemann Co., Newark, N. J.

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Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., Chicago.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.

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Cincinnati (Ohio) Shaper Co., The.
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Manville, E. J., Mch. Co., Waterbury, Ct.
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Waterbury (Ct.) Farrel Fdry. & Mch. Co.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Trimming
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Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PROJECTORS—Contour Measuring
Bausch & Lomb Optical Co., Rochester, New York.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.

PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rumsey Pump Corp., Seneca Falls, N. Y.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.

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Ruthman Machinery Co., Cincinnati.

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Fairbanks, Morse & Co., Chicago.

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PUMPS—Power
Fairbanks, Morse & Co., Chicago.

PUMPS—Rotary
Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.

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Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Vacuum
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
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Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
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PYROMETERS—Indicating
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Brown Instrument Co., Philadelphia.
Hoskins Mfg. Co., Detroit, Mich.

RAIL SPLICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Foster, L. B., Co., Inc., Pittsburgh.
Frank, M. K., 480 Lexington Ave., N. Y. C.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

RAILS—Relaying
Hyman-Michaels Co., Chicago.
Sherwood, E. C., 7 Dey St., N. Y. C.

RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.

REAMERS
Cleveland (Ohio) Twist Drill Co., The.
Gammons-Holman Co., Manchester, Conn.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

REAMERS—Expansion
Gammons-Holman Co., Manchester, Conn.

REAMERS—Helical Taper Pin
Gammons-Holman Co., Manchester, Conn.

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Littell, F. J., Mch. Co., Chicago.

REFRACTORIES
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Cleveland (Ohio) Quarries Co., The.
Great Lakes Foundry Sand Co., Detroit.
Illinois Clay Products Co., Joliet, Ill.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

REINFORCEMENT FABRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.

RINGS—Welded
American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
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RIVET SETS
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RIVETS
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Clark Bros. Bolt Co., Millidale, Conn.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn, N. Y.
Oliver Iron & Steel Corp., Pittsburgh.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

RODS—Brass
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

RODS—Nickel Silver
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Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Metal & Thermit Corp., 120 B'way, N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Tna Welding, Inc., Cleveland, Ohio.

RODS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bethlehem (Pa.) Steel Co.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Bliss, E. W., Co., Toledo, Ohio.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bliss, E. W., Co., Toledo, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Ct.

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Mesta Mch. Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
United Engineering & Fdry. Co., Ptgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Hyde Park (Pa.) Fdry. & Mach. Co.
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Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Ptgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Iron and Steel
Newport (Ky.) Rolling Mill Co., The.

RUBBER LININGS
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Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
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Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Bonding Process Corp., 10401 Northlawn Ave., Detroit.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Bonding Process Corp., 10401 Northlawn Ave., Detroit.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Bonding Process Corp., 10401 Northlawn Ave., Detroit.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

RUST REMOVING
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

SAND BLAST EQUIPMENT AND MACHINES
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Panghorn Corporation, Hagerstown, Md.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee, Wis.

SAND—Foundry
Great Lakes Foundry Sand Co., Detroit.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Great Lakes Foundry Sand Co., Detroit.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O., & Snow Co., The, Cleveland.

SAND RAMMERS
Chicago Pneumatic Tool Co., 6 East 44th St., N. Y. C.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

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Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SCALES
Fairbanks, Morse & Co., Chicago.

SCREENS—Perforated Metal
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chi.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace, Co., The, Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven
Houde Engineering Corp., Buffalo, N. Y.
National Acme Co., The, Cleveland.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW MACHINERY—Hand
Hardinge Bros., Inc., Elmira, N. Y.
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
Acme Machine Tool Co., Cincinnati.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW PLATES
Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
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Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottemiller Wm. H., Co., Inc., York, Pa.

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Progressive Mfg. Co., The, Torrington, Ct.

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Progressive Mfg. Co., The, Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Bristol Co., The, Waterbury, Conn.
Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS, Socket, Head, Cap
Bristol Co., The, Waterbury, Conn.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N. Y.

SECOND-HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milwaukee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

SHAFTING—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Steel
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

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SHAPERS—Vertical
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

SHAPES—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Roebling's, John A., Sons Co., Trenton, N. J.

SHEAR BLADES & KNIVES
American Shear Knife Co., Homestead, Pa.
Heppenstall Co., Pittsburgh.

SHEARING MACHINES—Alligator
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Angle, Hand and Power
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N.Y.
United Engineering & Fdry. Co., Ptgh.

SHEARING MACHINES—Beam and Channel
Schatz Mfg. Co., The, Poughkeepsie, N.Y.
United Engineering & Fdry. Co., Ptgh.

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Morgan Engineering Co., The, Alliance, O.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Ptgh.

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SHEARING MACHINES—Plate
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Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry & Co., Inc., 90 West St., N.Y.C.
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United Engineering & Fdry. Co., Ptgh.

SHEARING MACHINES — Sheet and Plate
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N.Y.

SHEARS—Hand for Sheet Metal
Bremil Mfg. Co., Erie, Pa.

SHEET BARS
Andrews Steel Co., The, Newport, Ky.
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Bliss, E. W., Co., Toledo, Ohio.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

SHEET STEEL CONSTRUCTION
Berger Mfg. Co., The, Canton, Ohio.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
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Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
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Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
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Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
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Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Newport (Ky.) Rolling Mill Co., The.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
Carnegie-Illinois Steel Corp. (U. S. Stee Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Continental Steel Corp., Kokomo, Ind.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Weirton (W. Va.) Steel Co.

SHEETS—Copper Alloy
American Brass Co., The, Waterbury, Conn.

SHEETS—Copper Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.

SHEETS — Enameling
American Rolling Mill Co., Middletown, O
Carnegie-Illinois Steel Corp. (U. S. Stee Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Long Terne
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Pickled
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.

SHELVING—Steel
Berger Mfg. Co., The, Canton, Ohio.

SHOWER BATH EQUIPMENT
Bradley Washfountain Co., Milwaukee.

SILICA SANDS
Great Lakes Foundry Sand Co., Detroit.

SILICO MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SILICON METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SLABS
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Detroit Rex Products Co., Detroit, Mich.

SPACING TABLES—Punching & Shearing
Thomas Spacing Mach. Co., Pittsburgh.

SPECIAL MACHINERY
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Bullard Co., The, Bridgeport, Conn.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Houde Engineering Corp., Buffalo, N. Y.
Manville, E. J., Mch. Co., Waterbury, Ct.
Morgan Engineering Co., The, Alliance, O.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Wood, R. D., & Co., Philadelphia.

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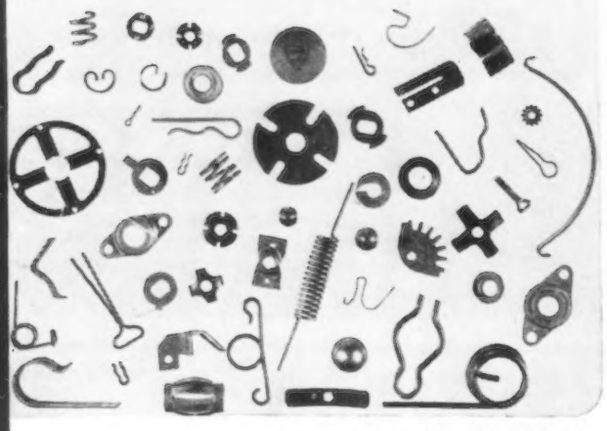

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Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Philadelphia (Pa.) Gear Works.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SPIKES—Track
Ames, W., & Co., Jersey City, N. J.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SPINDLES—Grinding
Ex-Cell-O Aircraft & Tool Corp., 1100 Oakman Blvd., Detroit.

SPINDLES—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

SPLICE BARS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SPRAYERS—Metal
Metals Coating Co. of America, Philadelphia, Pa.

SPRING MAKING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Car
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Muehlhausen Spring Co., Logansport, Ind.

SPRINGS—Extension, Compression, Torsion or Flat
Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Cook Spring Co., Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Cuyahoga Spring Co., The, Cleveland.
Dunbar Bros. Co., Bristol, Conn.
Gibson, Wm. D., Co., Chicago.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Muehlhausen Spring Co., Logansport, Ind.
Raymond Mfg. Co., Corry, Pa.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Wks., Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Berger Mfg. Co., The, Canton, Ohio.
Central Iron & Steel Co., Harrisburg, Pa.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Spring Co. Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Crosby Co., The, Buffalo, N. Y.
Dunbar Bros., Co., Bristol, Conn.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass
Gibson, Wm. D., Co., Chicago.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Michigan.
Lansing (Mich.) Stamping So., So. Penn. Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Corry, Pa.
Sheet Metal Specialty Co., Pittsburgh, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Ct.) Co.
Transue & William Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

STAPLES—Wire
Continental Steel Corp., Kokomo, Ind.
Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, Ohio.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Bright Finished
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome
Andrews Steel Co., The, Newport, Ky.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver
Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cobalt
Darwin & Milner, Inc., Cleveland.

STEEL—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Pittsburgh.
Latrobe (Pa.) Electric Steel Co.
Rathbone, A. B. & J., Palmer, Mass.
Ryerson, Joseph T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips
Acme Steel Co., Chicago.
Allegheny Steel Co., West Leechburg Div., Brackenridge, Pa.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Athenia Steel Co., 135 William St., N. Y.
Bethlehem (Pa.) Steel Co.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Pgh.
Thomas Steel Co., The, Warren, Ohio.
Weirton (W. Va.) Steel Co.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electric Copper Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro-Galvanized
Acme Steel Co., Chicago, Ill.
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Midvale Co., The, Nicetown, Phila., Pa.

STEEL—Crucible
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die
Andrews Steel Co., The, Newport, Ky.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Disston, Henry, & Sons, Inc., Philadelphia.
Finkl, A., & Sons Co., Chicago.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Electric
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

Products Index

STEEL—High Speed
Bethlehem (Pa.) Steel Company.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips
Acme Steel Co., Chicago.
Allegheny Steel Co., West Leechburg Div., Brackenridge, Pa.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Weirton (W. Va.) Steel Co.

STEEL—Hot Rolled Strips, Electro Zinc Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Hot Rolled Strips, Galvanized
Acme Steel Co., Chicago.

STEEL—Magnet
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Latrobe (Pa.) Electric Steel Co.

STEEL—Nickel
Andrews Steel Co., The, Newport, Ky.

STEEL—Open Hearth
Andrews Steel Co., The, Newport, Ky.
Pittsburgh (Pa.) Steel Co.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.

STEEL—Rustless
Acme Steel Co., Chicago.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Screw
Bliss & Laughlin, Inc., Harvey, Ill.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis
Allegheny Steel Co., West Leechburg Div., Brackenridge, Pa.
Andrews Steel Co., The, Newport, Ky.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.

STEEL—Spring
Athenia Steel Co., 135 William St., N. Y.
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Gibson, Wm. D., Co., Chicago.
Great Lakes Steel Corp., Detroit.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.

STEEL—Stainless
Acme Steel Co., Chicago.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad
Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Darwin & Milner, Inc., Cleveland.
Disston, Henry, & Sons, Inc., Philadelphia.
Ingersoll Steel & Disc Co., Chicago.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge Mass.

STEEL—Tool, Special Shapes
Latrobe (Pa.) Electric Steel Co.

STEEL—Vanadium
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL PLANTS AND ROLLING MILLS
Brassert, H. A., & Co., Chicago, Ill.

STEEL ROLLS
United Engineering & Fdry. Co., Ptgh.

STOKERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

STOP WATCHES
Stillman, M. J., Co., Inc., Chicago.

STOPS—Crane Limit
Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Medart Co., The, St. Louis, Mo.

STRUCTURAL IRON AND STEEL WORK
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL — See Angles, Beams, Channels and Tees

STUDS
Erie (Pa.) Bolt & Nut Co.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES
Torrington (Ct.) Co.

SWITCHES—Electric
Westinghouse Elec. & Mfg. Co., East Ptgh.

TANK LININGS
Cellcote Co., The, Cleveland.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

TANK LININGS—Rubber
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Compressed Air, Gas, Oil and Water
Scaife, Wm. B., & Sons Co., Ptgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Elevated Wood
Hauser-Stander Tank Co., The, Cincinnati, Ohio.

TANKS—Iron and Steel
Scaife, Wm. B., & Sons Co., Ptgh.

TANKS—Lead Lined
Hauser-Stander Tank Co., The, Cincinnati, Ohio.

TANKS—Pickling
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.
Cleveland (Ohio) Quarries Co., The.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

TANKS—Rubber Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TANTALUM CARBIDE
Vanadium-Alloys Steel Co., Vascoloy-Ramet Div., North Chicago, Ill.

TAPPING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS—Collapsing
Landis Mach. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TESTING MACHINES—Materials
Baldwin-Southwark Corp., Southwark Div., Philadelphia.

THERMOMETERS—Recording
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Philadelphia.

THREAD CUTTING TOOLS—See Dies Taps

THREAD ROLLING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

THREADING MACHINES
Eastern Mch. Screw Corp., New Haven, Conn.
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Bolt
Murchey Machine & Tool Co., Detroit.

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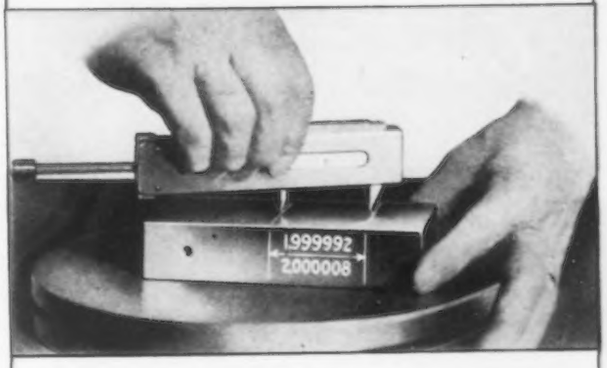

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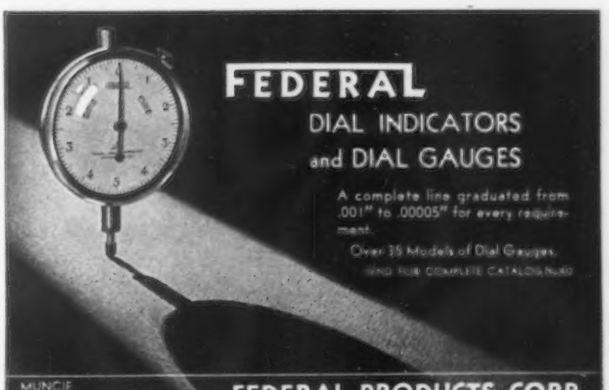
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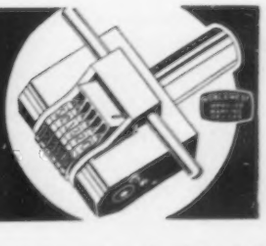

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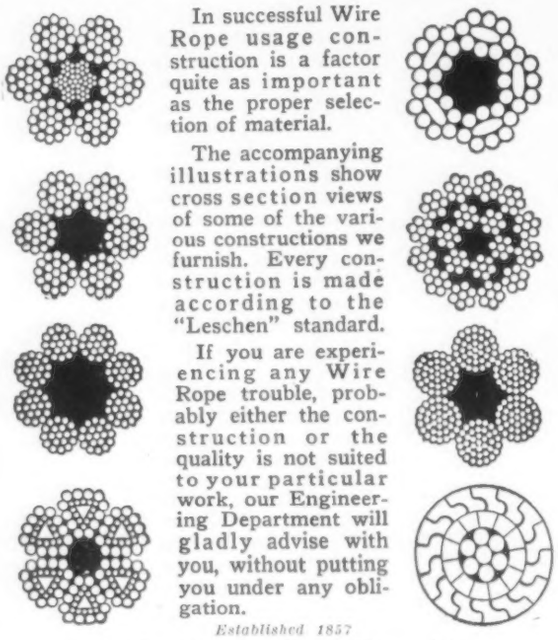

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Products Index

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.
Continental Steel Corp., Kokomo, Ind.

TIMING INSTRUMENTS
Stillman, M. J., Co., Inc., Chicago.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T. & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TONGS—Automatic
Heppenstall Co., Pittsburgh.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Vanadium-Alloys Steel Co., Vascoloy-Ramet Div., North Chicago, Ill.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Vanadium-Alloys Steel Co., Vascoloy-Ramet Div., North Chicago, Ill.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Michigan Tool Co., Detroit, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Vanadium-Alloys Steel Co., Vascoloy-Ramet Div., North Chicago, Ill.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.
Vanadium-Alloys Steel Co., Vascoloy-Ramet Div., North Chicago, Ill.

TOOLS—Tantalum Carbide
Vanadium-Alloys Steel Co., Vascoloy-Ramet Div., North Chicago, Ill.

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

TRACTORS AND TRAILERS—See Trucks, Tractors and Trailers—Industrial

TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems
American Monorail Co., Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A., & Sons Rope Co., St. Louis, Mo.

TRANSMISSIONS—Hydraulic
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.
Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeves Pulley Co., Columbus, Indiana.

TREADS—Safety
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

TRUCKS—Dump (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)
Baker-Raulang Co., 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co, The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Lift (Hand & Foot)
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS, TRACTORS AND TRAILERS—Industrial
Atlas Car & Mfg. Co., The, Cleveland.
Baker-Raulang Co., 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila. Div. Phila., Pa.

TUBE MILL MACHINERY
Aetna-Standard Engineering Co., The Youngstown, Ohio.
United Engineering & Fdry. Co., Ptgh.

TUBES—Boiler
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy
American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon
Steel & Tubes, Inc., Cleveland.

TUBES—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel
Cleveland (Ohio) Tool & Supply Co.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.

TUBING—Hard Rubber
American Hard Rubber Co., 11 Mercer St., N. Y. C.

TUBING—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
Steel & Tubes, Inc., Cleveland.

TUBING—Open Seam
Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

TUBING—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBING—Square and Rectangular
Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
Cleveland (Ohio) Tool & Supply Co.
Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper
Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned—Steel
Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel
Bissett Steel Co., The, Cleveland.

TUBING—Welded Steel
Bundy Tubing Co., Detroit, Mich.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

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General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS
Spencer Turbine Co., Hartford, Conn.

TURNTABLES
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial
Canton Fdry. & Mch. Co., Cleveland.

TWIST DRILLS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS
Crane Co., Chicago.

VALVE DISCS
Garlock Packing Co., The, Palmyra, N. Y.

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Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

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Littell, F. J., Mch. Co., Chicago.

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Crane Co., Chicago.
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Vickers, Inc., 1420 Oakman Blvd., Detroit, Mich.
Wood, R. D., & Co., Philadelphia

VALVES—Pump, Rubber
Garlock Packing Co., The, Palmyra, N. Y.

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VARNISH—Acid Resisting
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

VISES
Jarecki Mfg. Co., Erie, Pa.

WASHROOM FOUNTAINS
Bradley Washfountain Co., Milwaukee.

WASHERS—Iron or Steel
Central Iron & Steel Co., Harrisburg, Pa.

Products Index

WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
WASHERS—Lock
American Nut & Bolt Fastener Co., Pittsburgh.
Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Helz & Helz, Inc., 33—34th St., Brooklyn, N. Y.
Hobbs Mfg. Co., Worcester, Mass.
Houde Engineering Corp., Buffalo, N. Y.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.
WASHERS—Spring
American Nut & Bolt Fastener Co., Pittsburgh.
Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.
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Scaife, Wm. B., & Sons, Ptgh.
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Bundy Tubing Co., Detroit, Mich.
WELDING—Electric
Thomson-Gibb Elec. Welding Co., Lynn, Mass.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.
WELDING—Thermit
Metal & Thermit Corp., 120 B'way, N. Y. C.
WELDING CONTACTORS
Clark Controller Co., The, Cleveland.
WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
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Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.
WELDING FIXTURES
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Una Welding, Inc., Cleveland, Ohio.
WELDING MACHINES—Butt
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Thomson-Gibb Elec. Welding Co., Lynn, Mass.
WELDING MACHINES—Electric Arc
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.
WELDING MACHINES — Electric Arc, Second-Hand. (See Clearing House Section)
WELDING MACHINES—Flash
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.
WELDING MACHINES—Press
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.
WELDING MACHINES—Seam
Thomson-Gibb Elec. Welding Co., Lynn, Mass.
WELDING MACHINES—Spot
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.
WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
WIRE—Barb
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
WIRE — Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.
WIRE—Electric Heat Resisting
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
WIRE—Flat, Round, Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Bristol, Conn.
Continental Steel Corp., Kokomo, Ind.
Page Steel & Wire Co., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Roebling's, John A., Sons Co., Trenton, N.J.
Simplex Wire & Cable Co., Cambridge A. Boston, Mass.
WIRE—Mattress
Roebling's, John A., Sons Co., Trenton, N.J.
WIRE, Netting
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A., Sons Co., Trenton, N.J.
Wickwire Brothers, Cortland, N. Y.
WIRE—Piano and Music
Prentiss, Geo. W., & Co., Holyoke, Mass.
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
WIRE—Special, Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.
WIRE—Spring
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace, Co., The, Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh, Pittsburgh (Pa.) Steel Co.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N.J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
WIRE—Spring (Music)
Webb Wire Works, New Brunswick, N. J.
WIRE—Stainless Steel
Page Steel & Wire Co., Monessen, Pa.
Webb Wire Works, New Brunswick, N. J.
WIRE—Steel
Bethlehem (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
WIRE—Water-proof Rubber Insulated
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WIRE—Welding
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American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Metal & Thermit Corp., 120 B'way, N. Y. C.
Page Steel & Wire Co., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N.J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Una Welding, Inc., Cleveland, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
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Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
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WIRE FORMING MACHINERY
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Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
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Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
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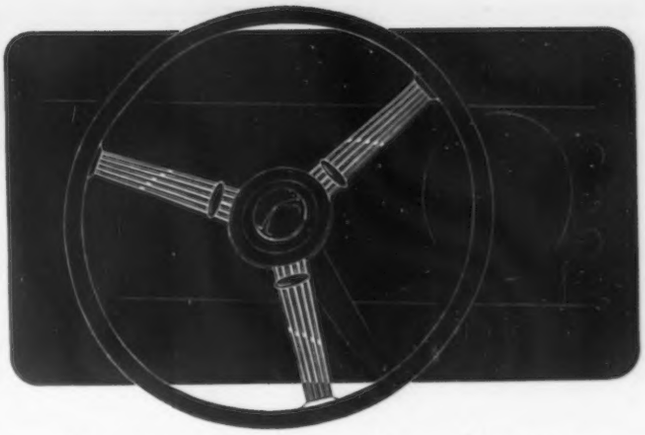

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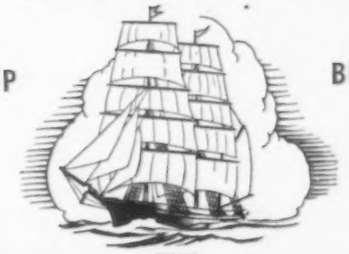
SHIP  BRAND

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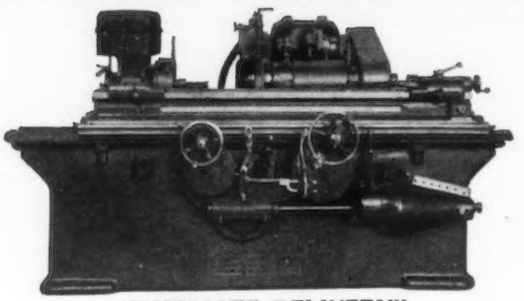

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13' 6" Southwark Vertical, Motor Driven. One Roll 32" dia. and Two Rolls 23" dia. Capacity 1½" Plate

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ANNUAL REVIEW NUMBER

of

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January 7

This is an issue that is used as a reference work during the entire year and is constantly consulted. Therefore, it gives the machinery dealers an opportunity to list all of their tools at a nominal cost.

Reservations for space are now being taken, and we urge that you write us and state approximately what space will be required in the big issue. Copy, of course, can come along later.

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3	48	56	1.10 " "	2.75 " "
4	36	48 32	1.10 " "	2.75 " "
5	40	44	1.10 " "	2.75 " "
6	32	40	1.10 " "	2.75 " "
8	32	36	1.10 " "	2.75 " "
10	24	28 32	1.10 " "	3.03 " "
12	24	28 32	1.10 " "	3.30 " "
14	20	24	1.10 " "	3.85 " "
1/4	24	32	.11 each	
1/4	20	28	.17 "	.29 each
5/16	18	24	.17 "	.32 "
3/8	16	24	.17 "	.37 "
7/16	14	20	.17 "	.43 "

Size	N.C.	N.F.	Our Price Carbon	Our Price H.S.
1/2	13	20	.22 each	.52 each
9/16	12	18	.28 "	.62 "
5/8	11	18	.33	.73 "
11/16	11	16	.39 "	.86 "
3/4	10	16	.44 "	1.03 "
7/8	9	14-18	.44 "	1.42 "
1	8	14	.55 "	1.91 "
1 1/8	7	12	.83 "	2.47 "
1 1/4	7	12	.83 "	3.15 "
1 3/8	6	12	.83 "	3.96 "
1 1/2	5	12	1.65 "	
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10"x24"	14"x50"
10"x36"	14"x72"
10"x50"	16"x50"
10"x72"	18"x96"
18"x120"	

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1—600	G. E.	2300/440	MT-Slip Ring	705
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1—300	Al. Ch.	2200	ANY-Slip Ring	585
1—250	F. Mor.	2200	BV-Slip Ring	1200
2—200	West.	220/440	CW-Slip Ring	900
1—200	G. E.	220/440	I-M-Slip Ring	900
1—150	G. E.	440	I-E13AA-S. R.	1750
1—100	West.	440/220	CW	600
1—100	G. E.	550/220	I-M	700
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5—15	D. C.	500/1000		550 G.E.	290
2—20	D. C.	500/1000		550 G.E.	340

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835 lbs.	5/8x9/16	1,394 lbs.	3/4x1 7/16
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2,908 lbs.	5/8x11/16	3,620 lbs.	11/16x2 1/2
2,157 lbs.	5/8x1 11/16	2,524 lbs.	11/16x3/4
870 lbs.	5/8x3/4	4,008 lbs.	11/16x1 3/4
643 lbs.	5/8x13/16	373 lbs.	11/16x1 1/4
2,000 lbs.	5/8x1 5/8	556 lbs.	11/16x11/16
3,500 lbs.	5/8x1 5/8	200 lbs.	1/4x5/32
1,688 lbs.	9/16x1 11/16	6,267 lbs.	1/4x5/8
239 lbs.	9/16x1 1/4	2,885 lbs.	1 1/4x1
10,972 lbs.	13/16x7/8	4,447 lbs.	13/16x7/8
85 lbs.	3/8 Rd.	4,397 lbs.	17/32x1 1/4
13,182 lbs.	9/16 Rd.	804 lbs.	7/8x1 1/2
11,100 lbs.	13/16 Rd.	26 lbs.	7/8x7/8
9,830 lbs.	15/16 Rd.	4,046 lbs.	13/16x1 1/2
91 lbs.	1 11/16 Rd.	3,477 lbs.	17/32x1
50 lbs.	1 1/4 Rd.	2,348 lbs.	3/4x1 7/16
1,577 lbs.	3/4x1 5/8	1,122 lbs.	1x1/2
5,221 lbs.	3/4x13/16	388 lbs.	1" Hex.
1,377 lbs.	3/4x7/8	3,848 lbs.	1/2" Hex.
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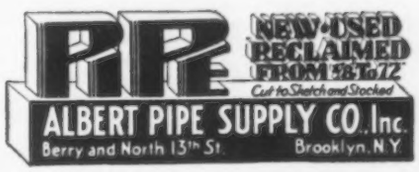

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25,000 sq. ft. One story. 10 ton crane. RR siding. Near New York.

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Preferably a graduate engineer with at least five years' actual experience in the design of machine tools with a progressive and successful company. Unusual opportunity for advancement for the right man.

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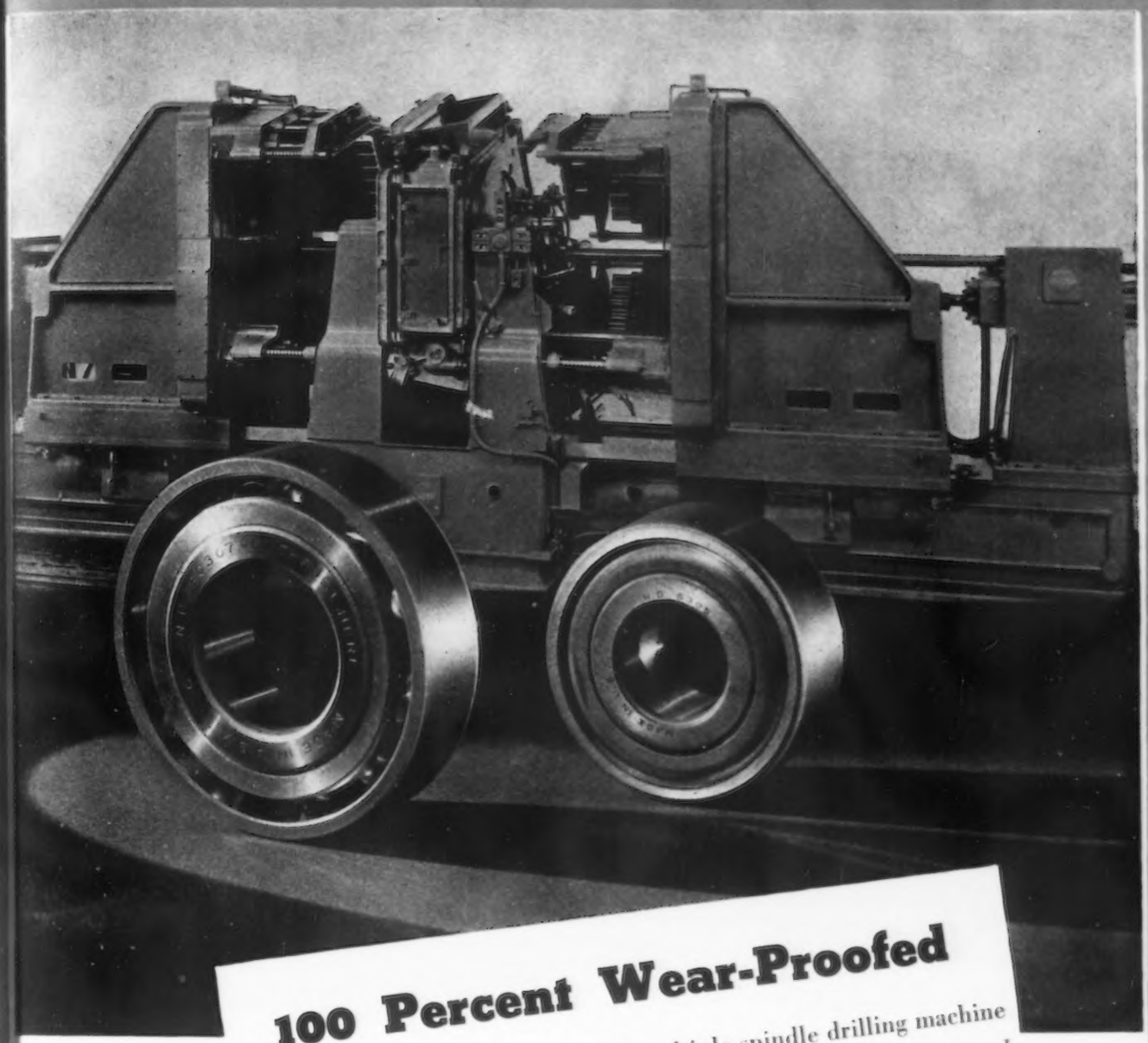

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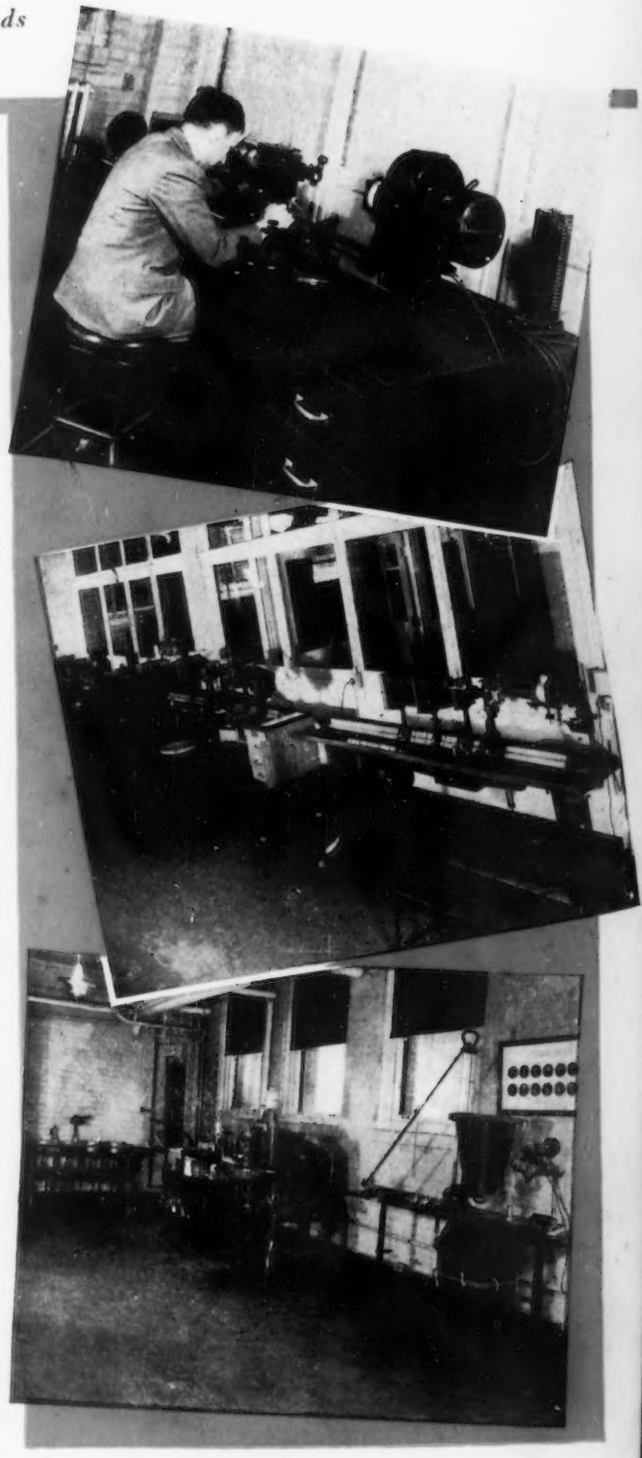

No. 4

Metallography

Metallographic inspection plays an exceedingly important part in the maintenance of the high and uniform physical properties for which Timken Alloy Steels are noted.

The Timken Metallographic Laboratory is one of the most efficient in the steel industry—both as regards the extent and modern-ness of its equipment and the knowledge and experience of its personnel.

In the course of the daily work of the Timken Metallographic Laboratory each heat of steel is carefully checked for grain size. Metallographic checks are likewise made of heat treated and annealed sections for machinability. A thorough check for non-metallic inclusions is also part of the regular routine. No heat is passed that does not comply with the customer's specifications for metallographic structure and cleanliness.

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THIS WEEK'S MACHINE TOOL ACTIVITIES

. . . Price advances bring large volume of new business.

o o o

. . . Automobile companies again active buyers for production lines.

Detroit

THE market for production machinery continues very active, as several of the leading automobile manufacturers are buying equipment to bolster up the lines. Packard continues to be an important factor, and Ford Motor Co. is engaged in a buying program for building up its lines on both the 60 and 85-hp. engines in a volume that has not been seen from this source for a long while. Chrysler is buying a few fill-in machines for its Jefferson Avenue plant, and there is talk of Dodge getting into production on a new cylinder block line; inquiries are already out for a fair portion of this equipment, but final decision on this program is yet to be made. The same situation is true at Plymouth.

Although jobbing tool shops were expected to enter the market in a rather big way in late fall, some hesitancy is now shown in making purchases. These shops have money to spend for new machinery, but they are reluctant to put their reserves into equipment unless the Federal tax law is amended. Large corporation shops, despite millions spent for production machinery, have yet to buy equipment for tool and die rooms. Here lies a large potential market for 1937.

Cleveland

MACHINE tool sales have gained, and the volume of business is very good, particularly for the closing month of the year. Orders are mostly for single machines for replacement purposes. The Cleveland Tractor Co. has purchased 10 or 12 machines. The 10 per cent price advance announced by a local manufacturer of turret lathes and hand screw machines has also been adopted by other manufacturers of these machines. There was a rush to replace orders before this advance became effective Dec. 8. Talk of price advances on other lines of machines evidently is speeding up the placing of orders.

Cincinnati

THE district market moved into greater activity and with definitely strong tone the past week. This was largely due to expanding demand for planers and boring mills, which, coupled with steady ordering of other types of machinery, boosted the sales level. The heavy tool demand, however, is largely from foreign sources, although domestic users indicate an early entry into the market. As a result of improved business, production has been stepped up to about 80 per cent, with at least one planer manufacturer operating full. Delivery on light tools is still a problem, but builders are taking a strong position and promising shipment only in accordance with plant facilities.

Pittsburgh

THE slight slowing up Thanksgiving Day week has disappeared, and the volume of inquiries has not only snapped back to its previous position, but is showing further signs of strength. Orders are being received in satisfactory volume, and dealers are being dogged by their customers every day on the question of delivery. The delivery situation grows more serious, and promises of two months given in one week often change to five months on additional orders for the same equipment before the week is out. Some standard lines cannot be furnished before 14 or 18 weeks, while special orders on which engineering data are required are taking anywhere from seven to eight months. Price increases are taking effect daily. Manufacturers are not waiting until the first of the year, and deadlines have been established from Dec. 4 on, with price increases ranging from 5 to 15 per cent, the latter figure being more in prominence.

Chicago

HIGHER prices again come to the fore with announcement by one boring equipment builder that quotations will be advanced Jan. 1, the percentage not being stated. Deliveries are pushing forward, and display floors have been cleared with no possibility of immediate replacements. General interest is on the upgrade. Inquiries are more numerous. Sales dragged last week, but dealers believe the fluctuation to be of no importance. A factor which is holding orders to a good December level is the strong tendency to take inventories as of fiscal rather than the calendar year. This plan is now keeping several farm implement manufacturers in the market. Small machine tools are moving very fast, and used equipment is in brisk demand.

New York

MACHINE tool sellers here report an unusually active December thus far. Orders received up to Dec. 4 in one office amounted almost to two-thirds of the total November business, which was 15 per cent less than that of October, and in nearly all offices, orders have been far above the same time last month. Buying has been diversified and steady. Railroads have not yet been much of a factor, but they are expected soon to enter the market. American Locomotive Co. and American Car & Foundry Co. have recently bought considerable new equipment, a reflection of increased locomotive and car purchases. Deliveries are growing worse, instead of improving, and, as a result, it is practically impossible to secure the better grade second-hand machines.

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and other sizes

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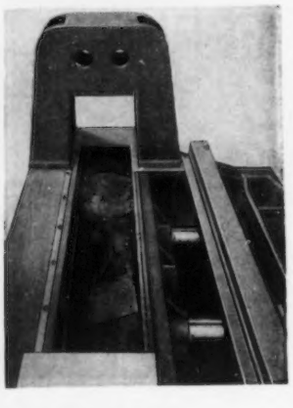
Double Ram Presses

in all sizes



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2724 S. 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

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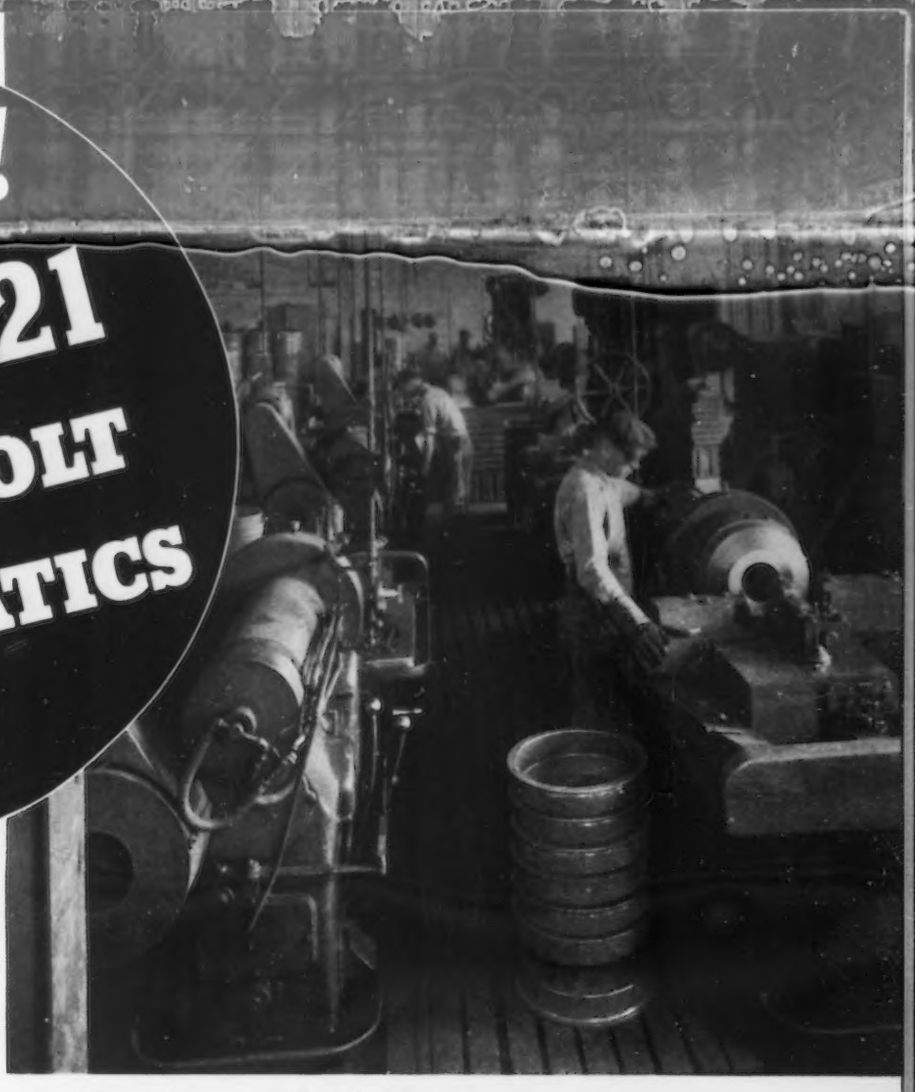


THE ENTIRE INSTALLATION PAID FOR ITSELF IN 14 MONTHS!

● In one year the eight Gisholt Simplimatics produced 213,113 motor truck brake drums at a saving of 63%.

This remarkable cost reduction was made possible by these outstanding features, combined only in Gisholt Simplimatics:

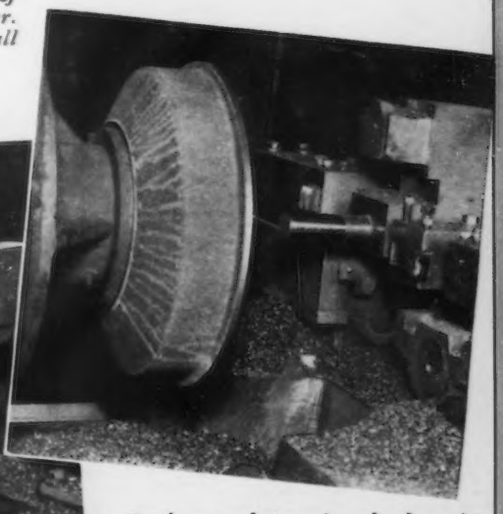
- ★ Designed for simultaneous cutting of all possible surfaces of the piece being machined.
- ★ Heavy, rigid construction to withstand the pressure of multiple tooling without vibration or distortion.
- ★ The operator is entirely relieved of physical effort—one operator usually tends several Simplimatics.
- ★ A simple, heavy-duty, automatic high-production lathe combining dependability with low maintenance cost.

In any highly competitive industry, such production economy is a matter of first importance.

A Gisholt survey may reveal how your work can be handled faster, better and at lower cost. Your request for a Gisholt engineer to call does not obligate you in any way.

Two different sizes were produced by these eight Gisholt Simplimatics: 14"—rate of 28 per hour and 16"—rate of 20 per hour. Note the compact arrangement and small floor space required.

In the first operation, the drum is chucked on the rough inside diameter. The hub hole is bored and the back faced. Boring and facing are carried on simultaneously.



In the second operation, the drum is mounted on a fixture, centralizing in the bore and held by air-operated fingers. The braking surface is bored and the flange is turned, faced and chamfered simultaneously.

●

GISHOLT

GISHOLT MACHINE COMPANY

1215 EAST WASHINGTON AVENUE, MADISON, WISCONSIN, U. S. A.

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • TOOL GRINDERS

PLANT EXPANSION AND EQUIPMENT BUYING

. . . Union Bag & Paper Co., New York, has authorized construction of third unit of plant at Savannah, Ga., to cost $3,000,000 complete.

o o o

. . . Ford Motor Co. plans an expenditure of $1,600,000 at branch plant at Windsor, Ont., for additions and equipment.

o o o

. . . Westinghouse Electric & Mfg. Co., East Pittsburgh, has plans for an addition to branch plant at Hamilton, Ont., costing $100,000 with equipment.

NORTH ATLANTIC

Continental Can Co., 100 East Forty-second Street, New York, plans one-story addition to branch plant at Syracuse, N. Y. Cost over $50,000 with equipment.

Edward W. Franco Engineering Corp., 4102 Fifth Avenue, New York, manufacturer of oil burners and oil burning equipment, has acquired building at 332 Ninth Street, and will remodel for plant.

General Electric Co., Schenectady, N. Y., has approved plans for one-story factory branch, storage and distributing plant at Houston, Tex., for which superstructure will begin at once. Cost over $100,000 with equipment.

H. Weinstein Machinery Co., 229 West Twenty-eighth Street, New York, printing machinery and parts, has leased property at 21-07 Borden Avenue, Long Island City, for plant.

United States Industrial Alcohol Co., 60 East Forty-second Street, New York, has filed plans for two-story addition to plant at Curtis Bay, Baltimore, 64 x 95 ft. Cost close to $30,000 with equipment.

Port of New York Authority, 111 Eighth Avenue, New York, has authorized early call for bids for about 52,000 tons of iron rings, for second or Northerly tube of Midtown Hudson tunnel. Cost about $2,640,000.

Pepsi-Cola Co., 47-51 Thirty-third Street, Long Island City, has taken over property at New Orleans for branch mechanical-bottling, storage and distributing plant for beverages. Cost over $150,000 with equipment.

Superior Neon Products Co., 148 West Twenty-third Street, New York, manufacturer of tube lighting equipment, etc., has leased space in building at 136-40 West Twenty-third Street for plant.

Union Bag & Paper Corp., Woolworth Building, New York, has authorized construction of third unit at new kraft pulp and paper mill at Hermitage Plantation, Savannah, Ga. Cost close to $3,000,000 with machinery. George F. Hardy, 309 Broadway, New York, is consulting engineer.

Ruberoid Co., 500 Fifth Avenue, New York, manufacturer of roofing products, has approved plans for one-story addition to branch plant at St. Louis, 80 x 805 ft., to increase present plant capacity about 50 per cent. Cost about $250,000 with machinery. Morris F. Marks, Ambassador Building, St. Louis, is engineer.

Wallace & Tiernan Co., Inc., 11 Mill Street, Belleville, N. J., manufacturer of equipment for water and sewage purification systems, has asked bids on general contract for three one-story additions on site to be vacated by Town Commission, totaling close to 100,000 sq. ft. floor space. Cost about $200,000 with machinery. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., is architect and engineer.

Owens-Illinois Glass Co., Ohio Building, Toledo, Ohio, will remodel its former glass works at South Glassboro, N. J., inactive for several years, and will convert plant for production of metal bottle caps and allied specialties. Equipment will be installed for employment of over 200 persons.

Department of Parks and Public Property, Newark Airport Administration, City Hall, Newark, N. J., James W. Costello, chief engineer, has authorized immediate call for bids for one, two and three-story hangar, 213 x 1108 ft., at Newark Airport, including steel framework. Cost about $1,300,000. Financing has been arranged through Federal aid.

Salem County Board of Education, Pennsgrove, N. J., plans manual training department in new two-story and basement central high school at Elmer, N. J. Cost about $230,000. B. H. Edwards, 130 North Broadway, Camden, N. J., is architect.

George W. Baker Machine Co., 218 French Street, Wilmington, Del., manufacturer of machinery and parts, plans rebuilding part of plant recently destroyed by fire. Loss about $75,000 with equipment.

Paragon Steel & Tool Co., East Rutherford, N. J., manufacturer or rock drills, tools, etc., is building an addition containing 4000 sq. ft. of floor space for increase in capacity.

NEW ENGLAND

Arrow-Hart & Hegeman Electric Co., 103 Hawthorne Street, Hartford, manufacturer of electrical products, has asked bids on general contract for five-story addition, 107 x 114 ft. Cost over $100,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are consulting engineers.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Dec. 18 for one motor-driven air compressor (Circular 91).

Security Fence Co., 22 Kent Street, Somerville, Mass., representative for Cyclone Fence Co., Waukegan, Ill., manufacturer of copper-bearing steel fencing, etc., has purchased former No. 1 mill of American Tube Works, 440 Somerville Avenue, for local plant, with department for manufacture of wire, wrought iron and kindred fencing products. William J. Thwing is head.

Wire Rope Corp. of America, Inc., 464 Congress Avenue, New Haven, Conn., will take bids on general contract for two additions to plant, one story, 150 x 150 ft., and two stories, 25 x 60 ft. Cost over $85,000 with equipment. Leo F. Caproni, 742 Elm Street, is architect and engineer.

Ford Motor Co., Dearborn, Mich., has let general contract to Franklin Construction Co., 30 Mystic Avenue, Medford, Mass., for one-story addition to branch assembling works at Somerville, Mass., 240 x 300 ft. Cost close to $175,000 with equipment.

United Liquors, Inc., 12 Lansdowne Street, Boston, has leased one and two-story building at 49-65 Lansdowne Street, 50,000 sq. ft. floor space, for new storage and distributing plant.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Dec. 17 for one motor-driven, deep-well turbine pumping unit with accessories (Proposal 398-48); until Dec. 18, 4454 steel drums for oil and gasoline, each 10-gal. capacity, and for 4454 flexible nozzle tubes (Proposal 398-40); until Dec. 23, automobile parts, including couplings, rivets, welding rods, etc. (Proposal 398-45).

Standard Wholesale Phosphate Co., Mercantile Trust Building, Baltimore, manufacturer of acid products, commercial fertilizers, etc., has asked bids on individual contracts for three-story addition to plant on Curtis Bay, 110 x 450 ft. Cost close to $100,000 with equipment.

Norfolk & Western Railway Co., N. & W. Railway Building, Roanoke, Va., asks bids until Dec. 16 for following equipment: 2000 carbon steel car axles (Contract Serial AA-692); 4000 one-wear rolled steel wheels (Contract AA-693); couplers and parts (Contract AA-694); about 2500 tons of steel shapes, plates and bars (Contract AA-695); New Century switchstands and parts (Contract AA-696); 2000 cast steel draft yokes (Contract AA-697); 4000 cast steel side frames (Contract AA-698); 2000 cast steel truck bolsters (Contract AA-699); 1990 cast steel combined striker and front draft lugs (Contract AA-700); 13,000 miscellaneous steel castings, including body side bearings, push pole pockets, body center plates and end door hinges (Contract AA-702). Clyde Cooke is purchasing agent.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 14 for 50,000 ft. wire rope, 10,000 ft. 3/8-in. steel guy rope, 3000 ft. 3/8-in. and 1/2-in. wire rope, 92,000 lb. common wire nails, 2000 lb. galvanized common wire nails, 1000 lb. copper wire slating nails, copper wire, bare resistance wire, power and lighting cable, copper connecting wire, phosphor bronze wire, malleable iron pipe fittigns, brass or bronze pipe fittings, angle valves, globe valves, unions, electric motors, current transformers, rigid steel conduit, copper tubing, watthour meters and other equipment (Schedule 3200).

SOUTH ATLANTIC

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 8 for spare parts for airplanes for

(CONTINUED ON PAGE 120)